Observations on the relative values of oral, rectal, urine, axillary and inguinal temperatures, especially in regard to tuberculosis; and the effects of exercise and other conditions.

- - - - - - - - - - - - -

In making these observations, my object has been, -

1. To ascertain the length of time it is necessary for the thermometer to remain "in situ" in order to record the correct body heat. With this object in view, the thermometry of the mouth, rectum, axilla, groin and urine, has been investigated.
2. To establish the amount of variation and the relative reliability of the reading of the thermometer placed in the mouth, rectum, urine, axilla and groin respectively.
3. To ascertain the effect of exercise and certain other conditions on the temperature in health, tuberculosis, and other diseases; - also in normal and tuberculous cows and other animals.

These observations-excepting those dealing with animals- have been taken on fifty-six inmates, (children and adults of both sexes) of the Norfolk and Norwich Hospital, suffering from various medical and surgical affections, during the months of December 1901, and January, February and March 1902.
The cases chosen have been as varied as possible, a large proportion were suffering from some form of tuberculosis, - intestinal, peritonitic, arthritic,

pleuritic, or pulmonary, - while the remainder were cases of, - Chlorosis, Diabetes Mellitus, Pleurisy, Dyspepsia, Endocarditis, Enteric Fever, Diphtheria, Endometritis, Ex-opthalmic goitre, Addison's disease, Malignant disease of the rectum and tonsil, Crétinism etc. Their ages varied from - one to sixty years. Specially selected, half-minute clinical thermometers, which had been tested at Kew, have been used throughout. All the observations have been taken with the greatest care and if necessary checked, if any doubt existed about the accuracy of a given reading it was either taken again, or discarded. As far as was possible the same thermometer was used for observations taken in different situations (comparison readings)- each patient being provided with a separate thermometer.

Oral Temperature.

The length of time required to ascertain the correct oral temperature -

- - - - - - - - - - - - -

979 separate readings have been taken in 33 cases. In by far the majority, 15 minutes were required to obtain a correct reading, occasionally 10 minutes were sufficient, and very rarely the mercury remained stationary after an interval of 5 minutes.

The average variation between a 5 minute mouth reading, (taken with a 30 second clinical thermometer) and a 15 minute one was 0.7 Deg.F. - the greatest single variation was 3.0 Deg.F, while there was frequently a difference of 1 or 2 degrees.

In support of this statement the temperature charts of ~~six~~ five cases are appended, - recording in all 138 observations, - which show diagramatically the amount of variation between the two readings.

- - - - - - - - - - - - -

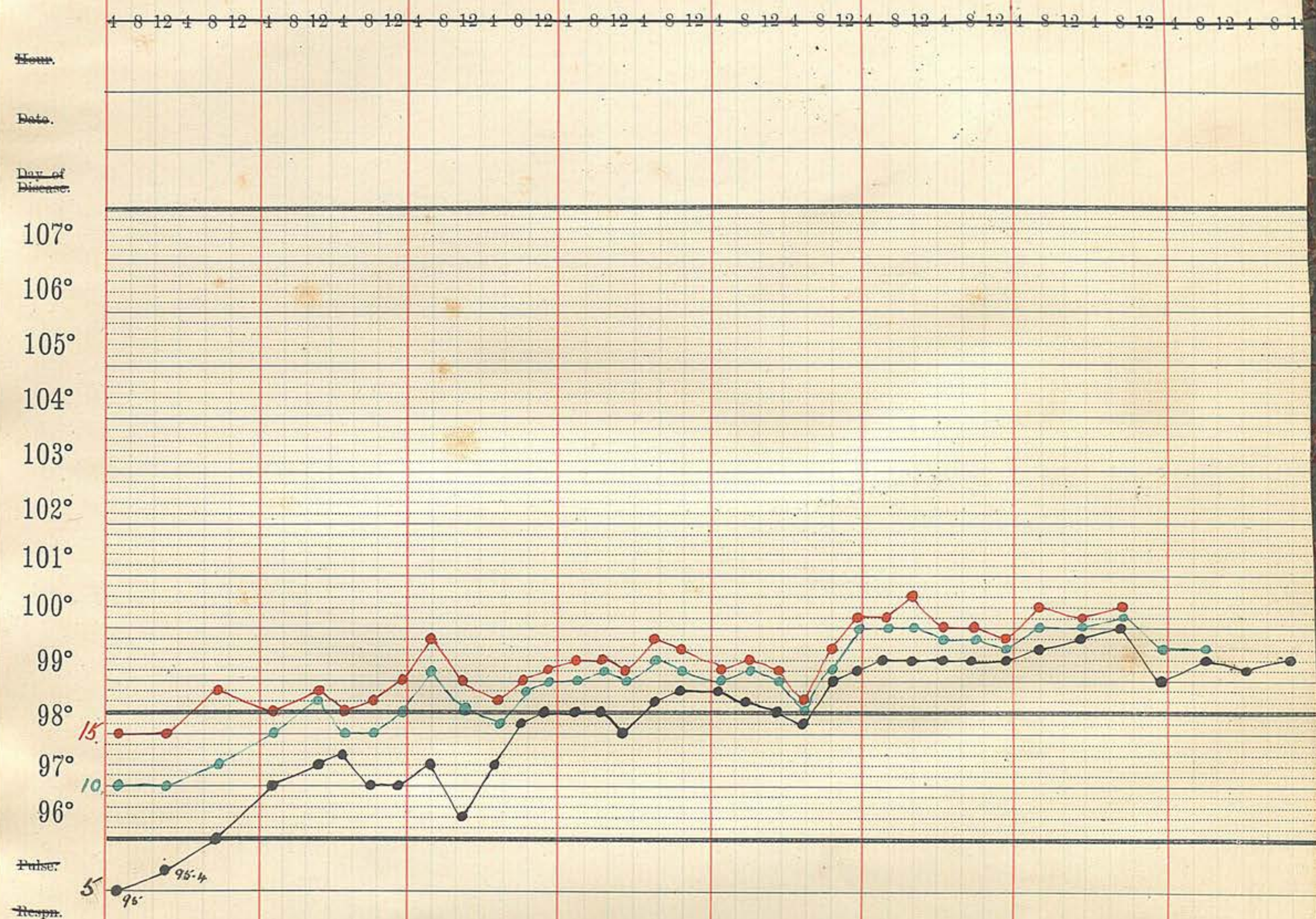
Different readings of the thermometer retained in the mouth for 5 or 15 minutes respectively.

Number.	Case.	Number of Observations.	Average Variation	Greatest Single Variation	Remarks.
			Deg.F	Deg.F	
1.	Pulmonary Tuberculosis	29	0.8	2.0	Hardly any cough.
2.	Pulmonary Tuberculosis	29	1.0	2.8	Bad case - much cough.
3.	Tuberculous Enteritis	18	0.4	0.8	Child aged 8 years.
4.	Tuberculous Peritonitis	10	0.6	2.1	Boy aged 14 years.
5.	Pulmonary Tuberculosis	36	1.0	3.0	Hardly any cough.
6.	Self	16	0.8	1.2	
		138	0.7	3.0	

Chart showing different readings of the thermometer, retained in the mouth for 5, 10 or 15 minutes respectively.

Patient's Name 7.— N.— (Case of Pulmonary Tuberculosis) ~~Ward~~

~~Month~~ Chart No.



~~B.O.~~

Red = Mouth temperature, at the end of 15 minutes.

~~Amt. of Urine.~~

Green = Mouth temperature, at the end of 10 minutes.

~~Sp. Gr.~~

Black = Mouth temperature, at the end of 5 minutes.

~~Reaction.~~

~~Albumen.~~

Total Observations = 36.

~~Sugar.~~

Average variation between a 5, & a 15 minute reading = 1.0 Deg. F.

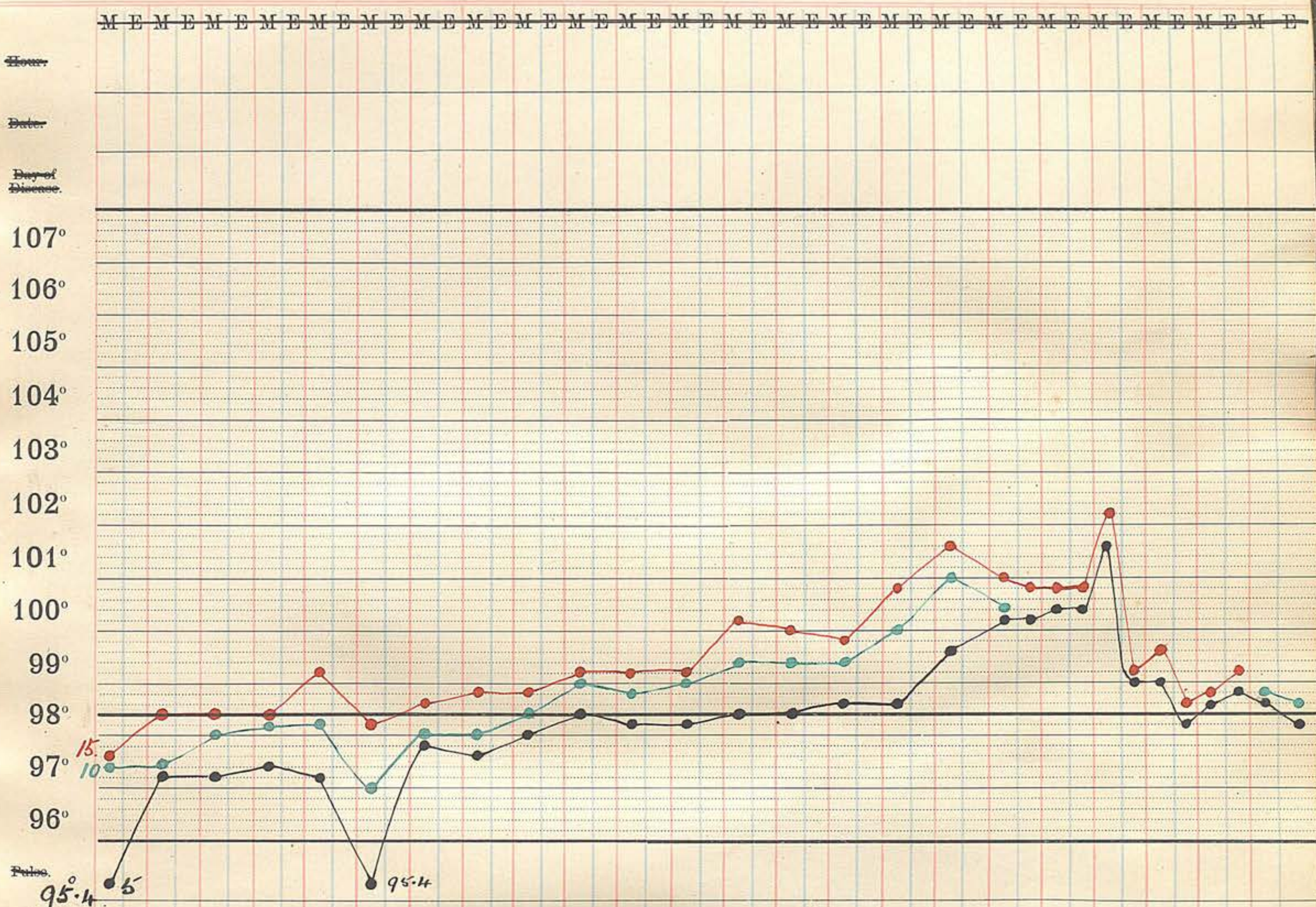
~~Vomit.~~

~~Weight.~~

Chart showing different readings of the thermometer, retained in the mouth for 5, 10 or 15 minutes respectively.

Patient's Name S. – H. – (Case of Pulmonary Tuberculosis). ~~Ward~~

~~Month~~ Chart No.



~~Respn.~~

~~B. O.~~

~~Amt. of Urine.~~

Red = Mouth Temperature, at End of 15 minutes.

Green = Mouth Temperature at end of 10 minutes.

Black = Mouth Temperature at end of 5 minutes.

~~Sp. Gr.~~

~~Reaction.~~

Total Observations = 29.

~~Albumen.~~

Average difference between a 5 & a 15 minute reading = 1·0 Deg. F.

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Chart showing different readings of the thermometer, retained in the mouth for, 5', 10, or 15 minutes respectively.

Patient's Name J. B. (case of Pulmonary Tuberculosis). ~~Ward~~

~~Month.~~ Chart No.

~~Hour.~~ 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12

~~Date.~~

~~Day of Disease.~~

107°
106°
105°
104°
103°
102°
101°
100°
99° 15'
10'
98°
5'
97°
96°

~~Pulse.~~
~~Respn.~~
~~B. O.~~
~~Amt. of Urine.~~
~~Sp. Gr.~~
~~Reaction.~~
~~Albumen.~~
~~Sugar.~~
~~Vomit.~~
~~Weight.~~

Red. = Mouth Temperature, at the end of 15 minutes.
Green = Mouth Temperature, at the end of 10 minutes
Black = Mouth Temperature at the end of 5 minutes.

Total Observations = 29.

Average variation between a 5', & a 15' minute reading } = 0.8 Deg. F.

Chart showing different readings of the thermometer, retained in the mouth for, 5, 10 or 15 minutes respectively.

Patient's Name Self. ~~Ward~~

~~Month~~ Chart No.

1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12

~~Hour.~~

~~Date.~~

~~Day of Disease.~~

107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°

20 minutes

20 minutes

15
10
5

~~Pulse.~~

~~Resp.~~

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

Weight.

Red. = Mouth Temperature at the end of 15 minutes.

Green = Mouth Temperature at the end of 10 minutes.

Black = Mouth Temperature at the end of 5 minutes.

Total Observations = 18.

Average Variation between a 5' & a 15' minute reading = 0·8. Dg. F.

Chart showing different readings reading of the thermometer, retained in the mouth for 5, 10 or 15 minutes respectively.

Patient's Name F. - C. - (case of Tubercular Enteritis). ~~Ward~~

child aged 8 years.

~~Month~~ Chart No.

~~M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E~~

~~Hour.~~

~~Date.~~

~~Day of Disease.~~

107°
106°
105°
104°
103°
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101°
100°
99°
98°
97°
96°

15
5

10 10 10 10 10

~~Pulse.~~

~~Respn.~~

Red = Mouth Temperature, at the End of 15 minutes.

Black = Mouth Temperature at the End of 5 minutes.

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Total Observations = 18.

Average variation between the two readings = 0·4, Deg. F.

The Temperature is represented -

at the end of	5 minutes	in black
at the end of	10 "	in green
at the end of	15 "	in red

The greatest average variation in two cases was, -
1.0 Deg.F.

The smallest average variation in one case was, -
0.4 Deg.F.

These six cases have not been specially selected, - but have been taken hap-hazard from a total number of 34, - the omitted ones showing just as much variation as those selected.

The length of time required to take the mouth temperature depends upon;-

(1) - Individual peculiarities, the precise nature of which may be doubtful.

(2) - The mouth chamber becoming cooled by continuous coughing either before, or after the introduction of the thermometer.

(3) - Some patients being habitually "mouth-breathers".

(4) - The external influence of cold air. Repeatedly I have observed that the thermometer placed in the mouth of a patient, who had recently been, or was still, in the open air, remains stationary for 5, 10, and even 15 minutes, but, when taken in the warmer atmosphere of the ward, the temperature immediately rises 2, 3 or more degrees.

The same delay of rise of the mercury is seen

in some cases, immediately after exercise in the open air, - the thermometer in the rectum, registering 100 to 103., in the mouth 95 to 97., - the colder the atmosphere the greater the disparity,- after resting half an hour in the warm ward, the oral reading will have gone up, so that the two temperatures will coincide.

(5)- The effect of drinking hot, cold, or iced fluids. -This point has been carefully worked out by Barlow, and the rule he laid down, - "That no "oral temperature should be recorded, until a "period of at least 40 minutes has elapsed, "after such fluids have been taken". - has on every occasion been observed in recording these observations.

(6)- Smoking or Talking,- Frequent opening and clos - ing of the oral chamber lowers its temperature. If the lips are kept carefully closed for 5 or 10 minutes immediately before the introduction of the thermometer, the time it is necessary for the latter to remain "in situ" is very considerably lessened.

In local inflammatory conditions of the mouth or fauces, or new growths of the tonsil, - the oral temperature is raised 2 or 3 points above the rectum.

Rectal Temperature.

The same thermometers that were employed to register the oral temperature, when inserted into the rectum take from 3 to 5 minutes to register the correct rectal temperature. 2 temperature charts are

Chart showing different readings of the thermometer retained in the rectum for 3 or 5 minutes respectively.

Patient's Name B. M. H. W. C.

~~Ward~~

~~Month~~

Chart No.

~~Hour.~~ 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12

~~Date.~~

~~Day of Disease.~~

107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°

(On 16 other occasions, there was no rise after 3 minutes)

(On 16 other occasions there was no rise after 3 minutes).

5'
3'

~~Pulse.~~

~~Resp.~~

~~B. Or~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Red. = Rectal readings at the end of 5 minutes.

Black = Rectal readings at the end of 3 minutes.

Total observations = ~~71~~ 72.

On 41 occasions Temperature was registered in 5 minutes.

On 31 occasions Temperature was registered in 3 minutes

appended recording in all 72 observations, which show diagramatically the amount of variation between a 3 and a 5 minute rectal reading, - to be from 2 to 8 points.

The temperature is represented -

at the end of 3 minutes in black

at the end of 5 " in red.

In by far the majority of cases, the time required for a correct reading is from 3 to 5 minutes, occasionally from 1, to 2 minutes is sufficient.

The presence of a rectal growth in close proximity to or surrounding, the bulb of the thermometer, does not affect the local temperature, but should the thermometer be plunged into faecal matter, at least an incorrect reading of from 2 to 4 points will be obtained.

Urine Temperature.

From 2 to 5 ounces of urine according to the care with which the stream in directed over the bulb of the thermometer, - are sufficient to register the correct temperature.

It is not necessary to have the bladder distended with urine.

It is impossible to estimate the temperature of the urine after it has been passed; I have attempted to do this by micturating into a urine glass, or test tube, which had been previously heated to a temperature only slightly lower than that likely to obtain, but the result was always a failure.

Inguinal Temperature.

The length of time required to take the correct groin temperature varies widely from 10 to 30 minutes.

The temperature chart of one case is published, - recording 27 observations, - showing diagramatically the amount of variation between a 5 and a 15 minute groin reading, - the average variation was 0.6 Deg.F.

There was no rise of temperature after 10 minutes on three occasions, but in the remaining 24 the temperature continued rising for 15 minutes.

The temperature is represented.-

at the end of 5 minutes in black

at the end of 15 " in red.

All the cases investigated have been in children under 9 years of age.

Axillary Temperature.

The length of time necessary to take the correct axilla temperature varies from 10 to 15 minutes.

The temperature chart of one case is published, recording 45 observations, - showing diagramatically the amount of variation between a 5,and a 15 minute axilla reading.- The average variation was 0.4 Deg.F.

The temperature is represented -

at the end of 5 minutes in black

at the end of 15 " in red.

Comparison Observations.

A number of observations have been made for the purpose of estimating the amount of variation,and the relative value of, the temperature in different sit-

Chart showing different readings of the thermometer retained in the groin for 5 or 15 minutes respectively.

Patient's Name F. C. (case of Tubercular Enteritis). ~~Ward~~

~~Month~~ Chart No.

~~1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 4 8 12~~

~~Hour.~~

~~Date.~~

~~Day of Disease.~~

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106°
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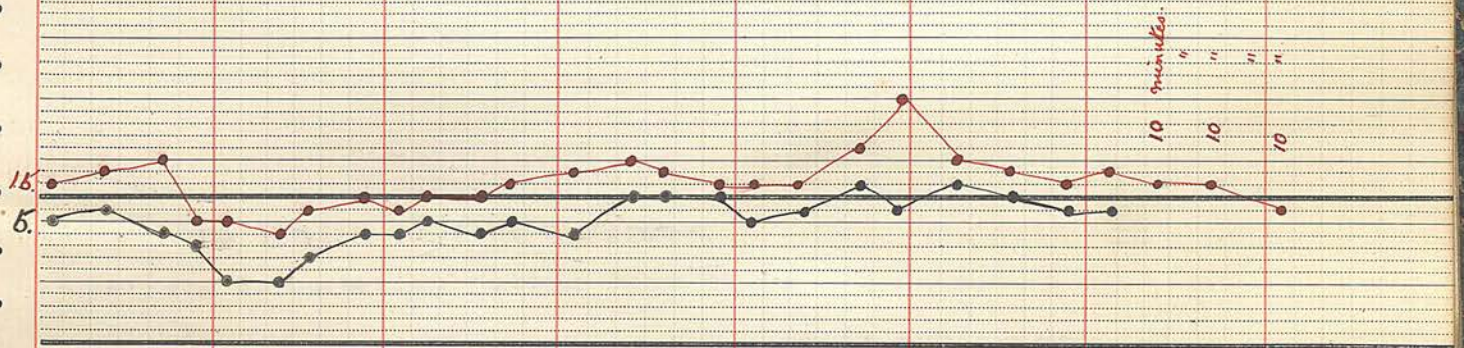
104°
103°
102°
101°
100°
99°
98°
97°
96°



~~Pulse.~~

~~Respn.~~

Red. = Inguinal Temperature taken for 15 minutes.

Black. = Inguinal Temperature taken for 5 minutes.

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight~~

Total observations = 27

Average variation between the two readings = 0.6. Deg. F.

Chart Showing different readings of the thermometer, retained in the axilla for 5 or 15 minutes respectively.

Patient's Name V. V. (Case of Pulmonary Tuberculosis). ~~Ward~~

~~Month~~ Chart No.

~~1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 1 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12~~

~~Hour.~~

~~Date.~~

~~Day of Disease.~~

107°
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103°
102°
101°
100°
99°
98°
97°
96°

10 minutes

15.
5.

~~Pulse.~~

~~Respn.~~

Red. = 15 minute axilla readings.

Black. = 5 minute axilla readings.

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Average variation in 45 readings = 0.4. Dg. F.

uations of the body, - mouth, rectum, urine, axilla, and groin, in health, tuberculosis, and other diseases. The rectal temperature is taken as the standard, and the temperature of other situations compared with it, the amount of variation being recorded in points, + or − according as the rectal temperature was higher or lower.

Table of Comparison Observations.

Situation.	Number of cases investigated	Number of comparison observations	Average Variation
Mouth and Rectal.	27	841	+ 0.3 Deg. F.
Urine and Rectal.	4	119	+ 0.5 " "
Groin and Rectal.	6	135	+ 0.6 " "
Axilla and Rectal.	9	324	+ 0.9 " "
	34	1414	

I

Mouth and Rectal.

In the 27 cases investigated, 841 comparison readings have been taken, showing an average variation of 0.3 Deg.F. + rectal, that is, the rectal temperature exceeded that of the mouth by 3 points.

In 2 cases only, (No: 18. Gastritis, and No: 22. Sarcoma of Tonsil) did the mouth temperature exceed that of the rectum.

Chart showing amount of variation between oral & rectal Temperature.

Patient's Name C. M. (case of Ex-opthalmic Goitre). ~~Ward~~

~~Month~~ Chart No.

M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E

~~Hour.~~

~~Date.~~

~~Day of Disease.~~

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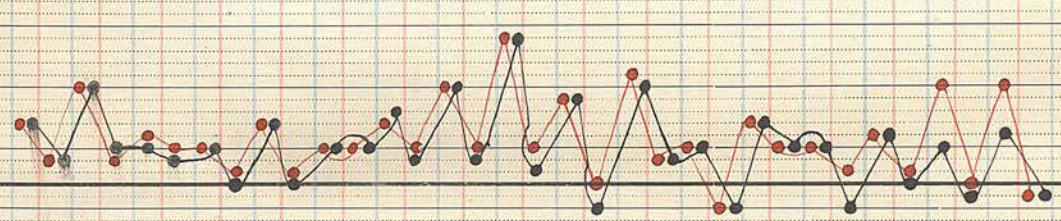


~~Pulse.~~

~~Respn.~~

Red = Rectal Temperature.

Black = Mouth Temperature.

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

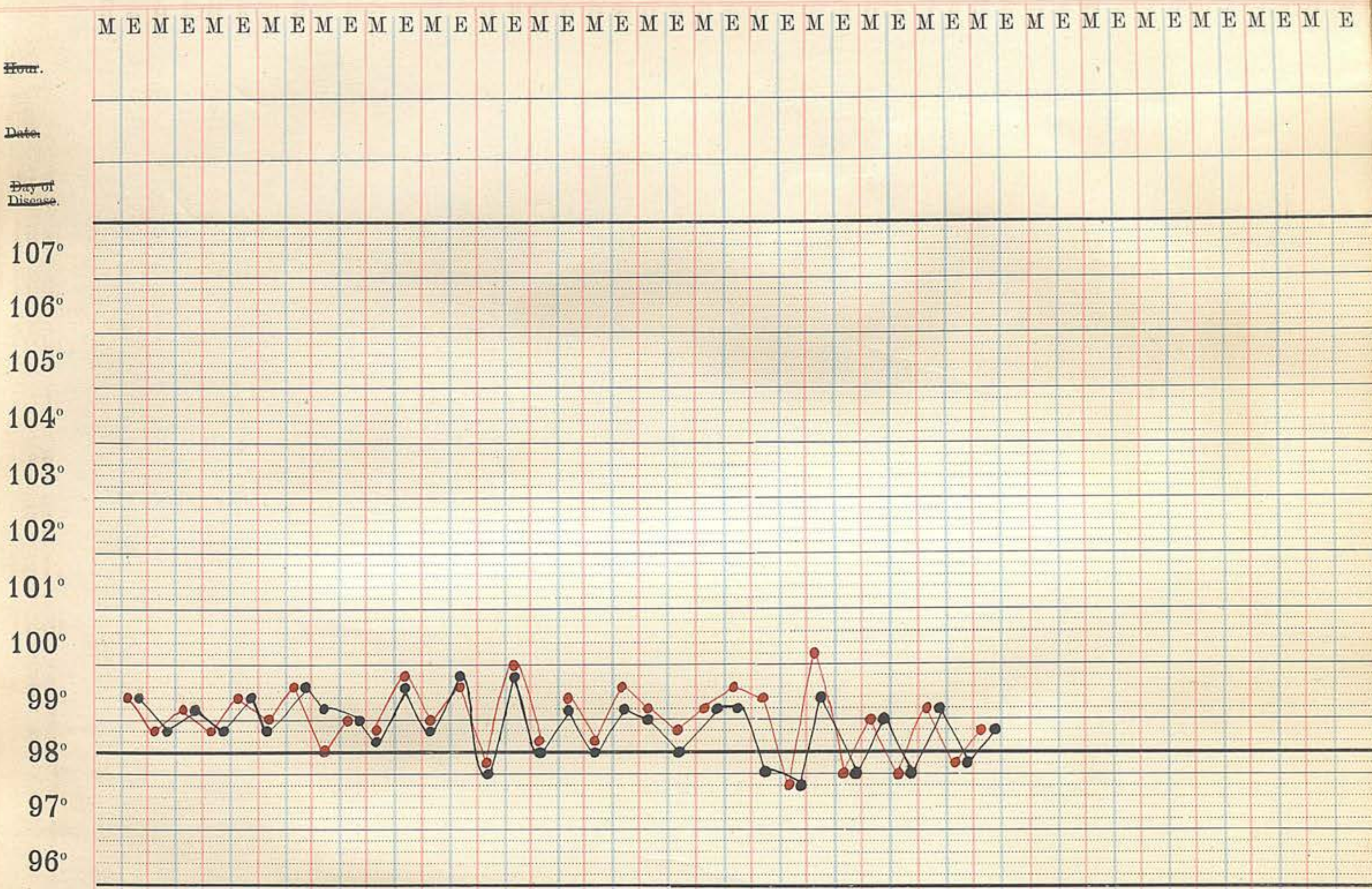
Total Comparison readings = 33.

Average variation = 0·1,+ Rectal.

Chart Showing amount of variation between oral & rectal Temperature.

Patient's Name M. S. (case of ? Spinal Caries). ~~Ward~~

~~Month~~ Chart No.



~~Pulse.~~

Red. = Rectal Temperature.

~~Respn.~~

Black = Mouth Temperature.

~~B.O.~~

~~Amt. of Urine.~~

Total Comparison readings = 32.

~~Sp. Gr.~~

Average Variation = 0·1. Deg. F. + Rectal.

~~Reaction.~~

~~Albumen.~~

Sugar.

~~Vomit.~~

~~Weight.~~

Chart showing amount of variation between oral & rectal Temperature.

Patient's Name E. B. (Case of Mucous Colitis) ~~Ward~~

~~Month~~ Chart No.

M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E M E

~~Hour.~~

~~Date~~

~~Day of Disease.~~

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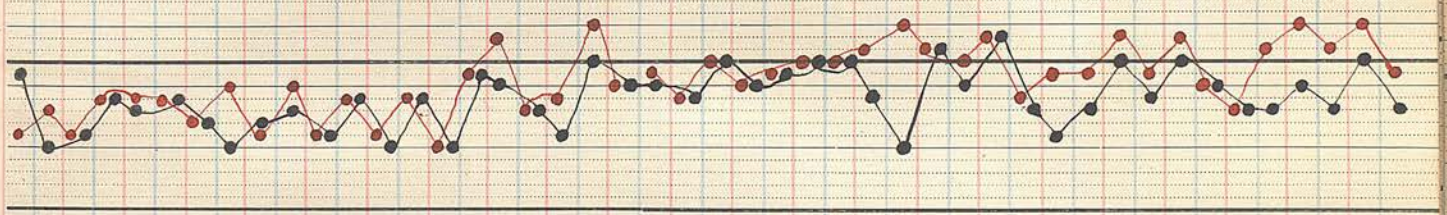
98°
97°
96°



~~Pulse.~~

~~Respn.~~

Red = Rectal Temperature.
Black = Mouth Temperature.

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

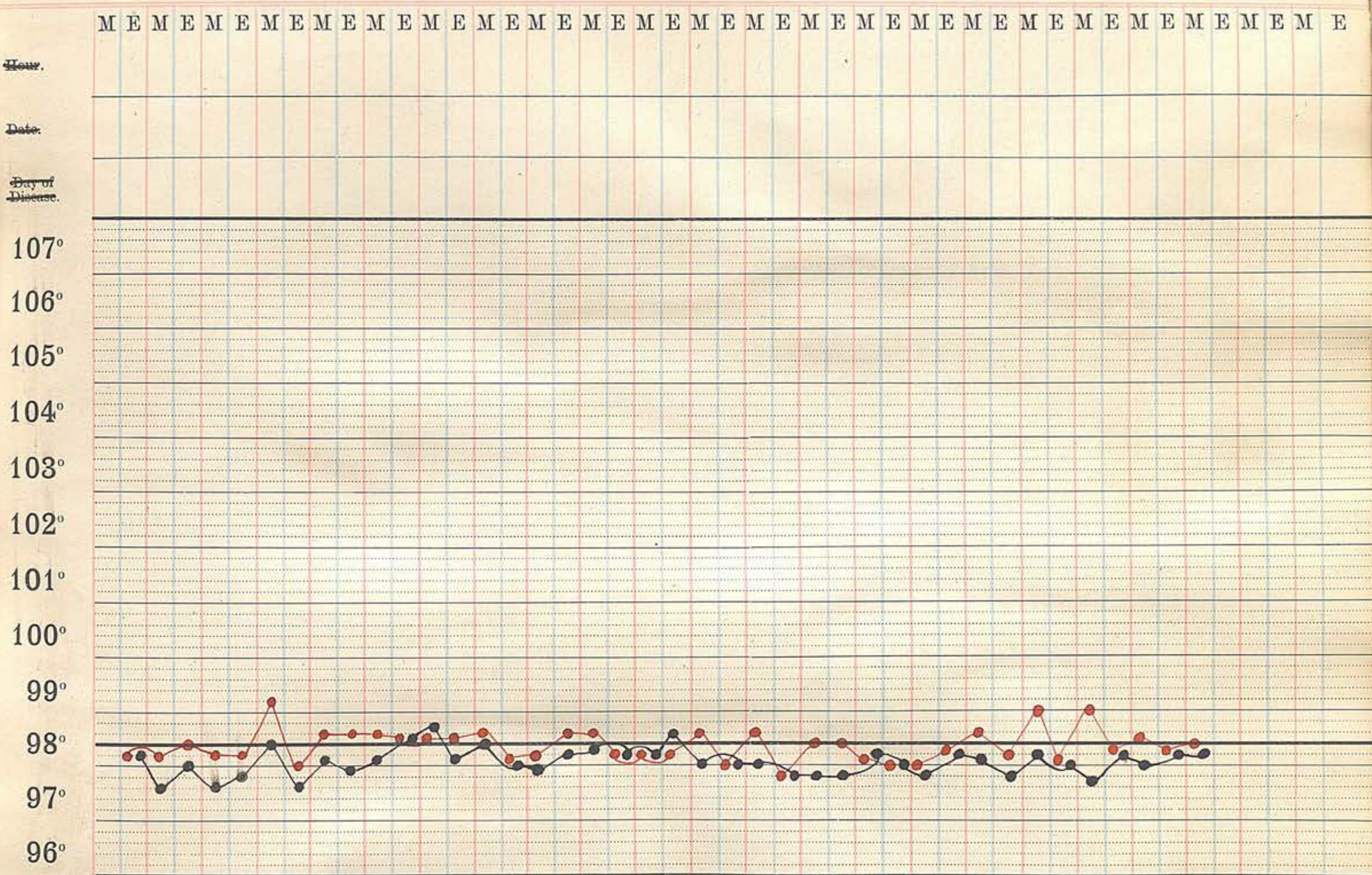
Total Comparison readings = 61. (46 only, shown on this Chart).

Average variation = 0·3 Deg. F. + Rectal.

Chart showing amount of variation between Oral & Rectal Temperature.

Patient's Name A. S. (case of Gastrectasis) ~~Ward~~

~~Month~~ Chart No.



~~Pulse.~~

~~Respn.~~

~~B.O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

Albumen.

Sugar.

~~Vomit.~~

Weight.

Red = Rectal Temperature.
Black = Mouth Temperature.

Total number Comparison Observations. = 40.

Average variation = 0·2 Deg. F. + Rectal

Chart showing amount of variation between Oral & Rectal Temperature.

Patient's Name E— C.— (Case of Tuberculous Peritonitis & Enteritis). ~~Ward~~

~~Month~~ Chart No.

4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12

~~Hour.~~

~~Date.~~

~~Day of Disease.~~

107°
106°
105°
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103°
M.
R.
102°
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100°
99°
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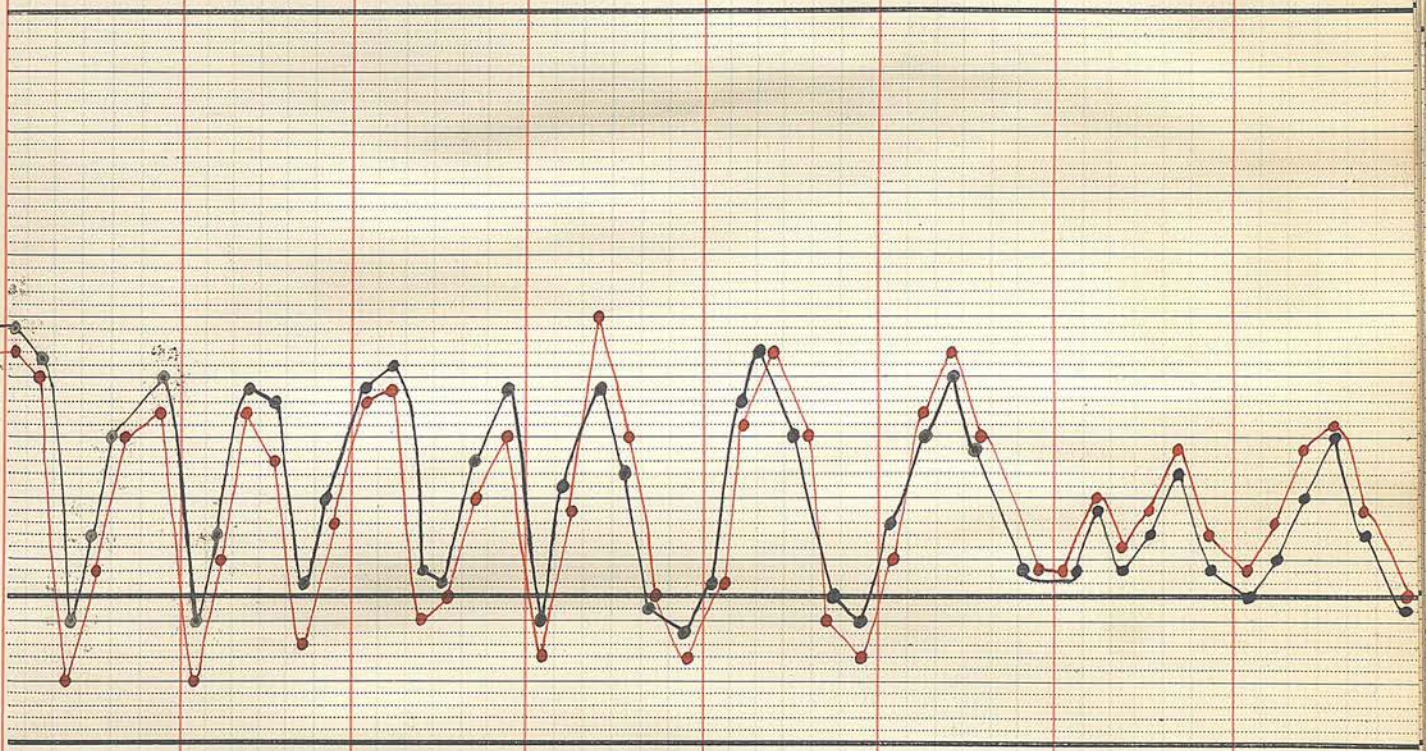
97°
96°



~~Pulse.~~

~~Respn.~~

Red. = Rectal Temperature.
Black = Mouth Temperature.

~~B. O.~~

~~Amt. of Urine.~~

Total Comparison Readings = 41.

~~Sp. Gr.~~

Average variation =, - 0·1 Dg. F.

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Chart showing amount of variation between oral & Rectal Temperature.

Patient's Name E.– C.– (Case of Tuberculous Peritonitis, & Enteritis). ~~Ward~~

~~Month~~ Chart No.

	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12
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~~Sugar.~~																																													
~~Vomit.~~																																													
~~Weight.~~																																													

Red. = Rectal Temperature.

Black = Mouth Temperature.

23.

In 6 cases the rectal temperature exceeded the mouth by 1 point.

In 4 cases the rectal temperature exceeded the mouth by 2 points. The greatest amount by which the rectal exceeded the mouth reading was 9 points, this occurred in two cases (Nos 5 and 19).

The rectal temperature was taken for 5 minutes and the mouth for 15 minutes, and in each case it was observed that the temperature in the latter situation almost invariably continued rising for 15 minutes.

Mouth and Rectal. Comparison Table.

Number	Case	Number of observations	Average variations	Remarks.
			Deg.F.	
1.	Tuberculous Peritonitis	18.	+ 0.1	Child aged 8.
2.	Phthisis	40.	+ 0.4	Bad case, much cough.
3.	Phthisis	12.	+ 0.2	Advanced case.
4.	Phthisis	33.	+ 0.4	
5.	Phthisis	26.	+ 0.9	Quiescent case.
6.	Phthisis	28.	+ 0.7	Ditto.
7.	Phthisis	46.	+ 0.3	Bad case.
8.	Phthisis; Tuberculous Peritonitis	30.	+ 0.4	Very bad case, much cough.
9.	Tuberculous Peritonitis and Enteritis.	71.	+ 0.1	
10.	Phthisis	15.	+ 0.1	Bad case, little cough.
11.	Gastrectasis	40.	+ 0.2	
12.	? Tubercle	32.	+ 0.1	
13.	Rectal Cancer	33.	+ 0.3	
14.	Endometritis	24.	+ 0.4	
15.	Mucous Colitis	61.	+ 0.3	
16.	Constipation	47.	+ 0.1	

Number	Case	Number of observations	Average variations	Remarks
			Deg.F.	
17.	Pleurisy and Chlorosis	21.	+0.3	
18.	Gastritis.	57.	-0.08	
19.	? Tubercle.	42.	+0.9	
20.	Gastrectasis.	47.	+0.3	
21.	Rectal Cancer.	24.	+0.3	
22.	Sarcoma Tonsil.	11.	-0.1	
23.	Exopthalmic Côitre.	33.	+0.1	
24.	Diabetes Mellitus.	19.	+0.2	
25.	Prolapsed ovary.	23.	+0.5	
26.	Convalescent Diphtheria.	30.	+0.4	
27.	Convalescent Diphtheria.	54.	+0.2	
27	Totals	841	+0.3	
10.	Total Tubercular Cases.	319	+0.3	

2. Urine and Rectal.

In the 4 cases investigated, 114 comparison observations have been taken, showing an average variation of 0.5 Deg.F.+rectal; that is the rectal temperature exceeded that of the urine by five points.
The greatest variation was 0.6 Deg.F.
The least variation was 0.4 Deg.F.

I would here draw attention to the comparatively small variations met with in the records of urine temperatures.

Urine and Rectal. Comparison table.

Number	Case	Number of observations	Average variation
			Deg.F.
1.	Endocarditis	40	+0.5
2.	Pulmonary Tuberculosis.	24	+0.4
3.	Pulmonary Tuberculosis.	28.	+0.5
4.	Self.	27.	+0.6
		119.	+0.5

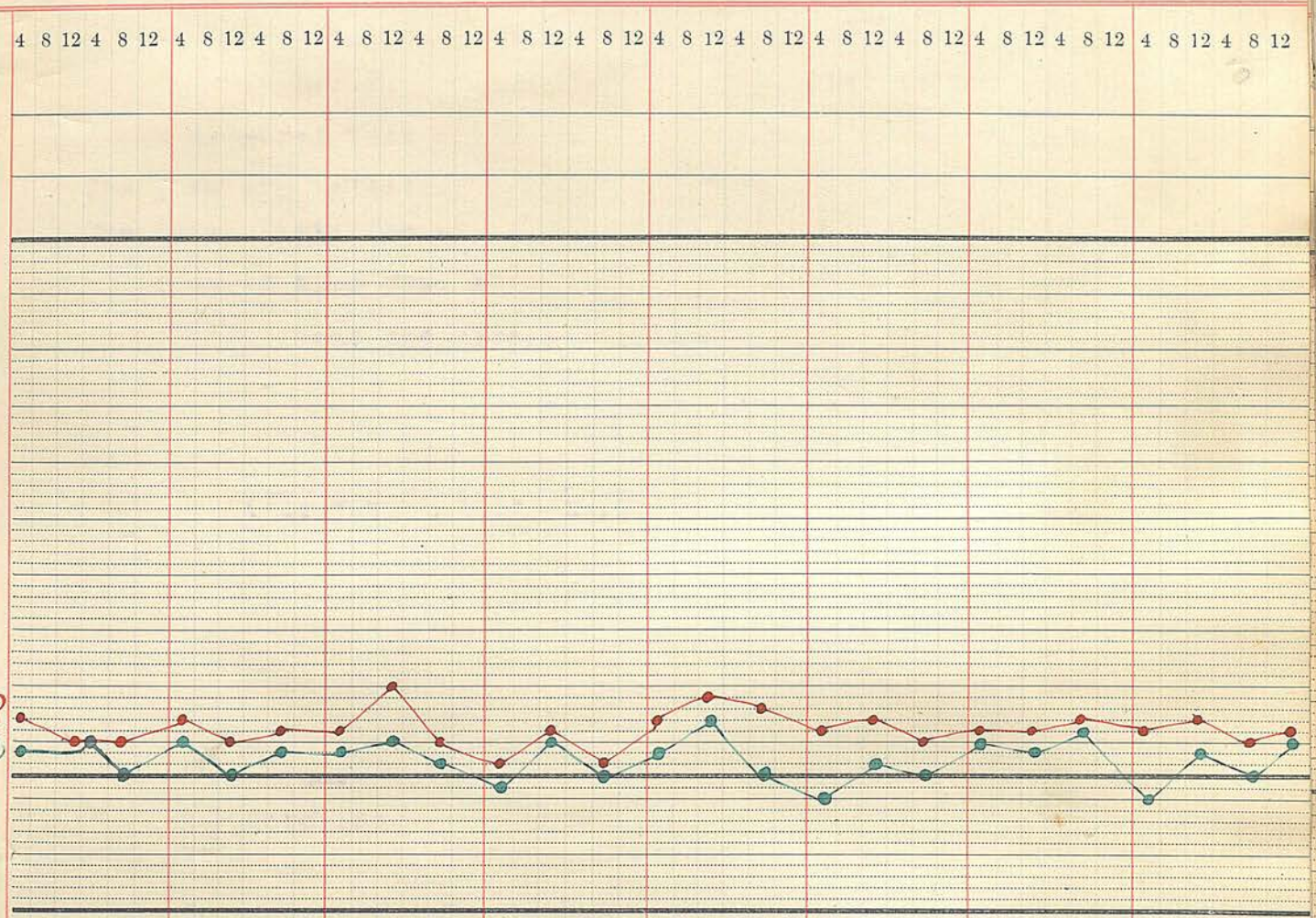
3. Groin and Rectal.

In the 6 cases investigated, 135, comparison observations have been taken, showing an average variation of 0.6 Deg.F.+rectal, that is the rectal temperature exceeded that of the groin by 6 points.
The greatest variation was 1.2 Deg.F.
The least variation was 0.1 Deg.F.

Chart showing amount of variation between rectal & Urine Temperature.

Patient's Name W. – C – (Case of Pulmonary Tuberculosis). ~~Ward~~

~~Month~~ Chart No.



Red. = Rectal Temperature.
Green = Urine Temperature.

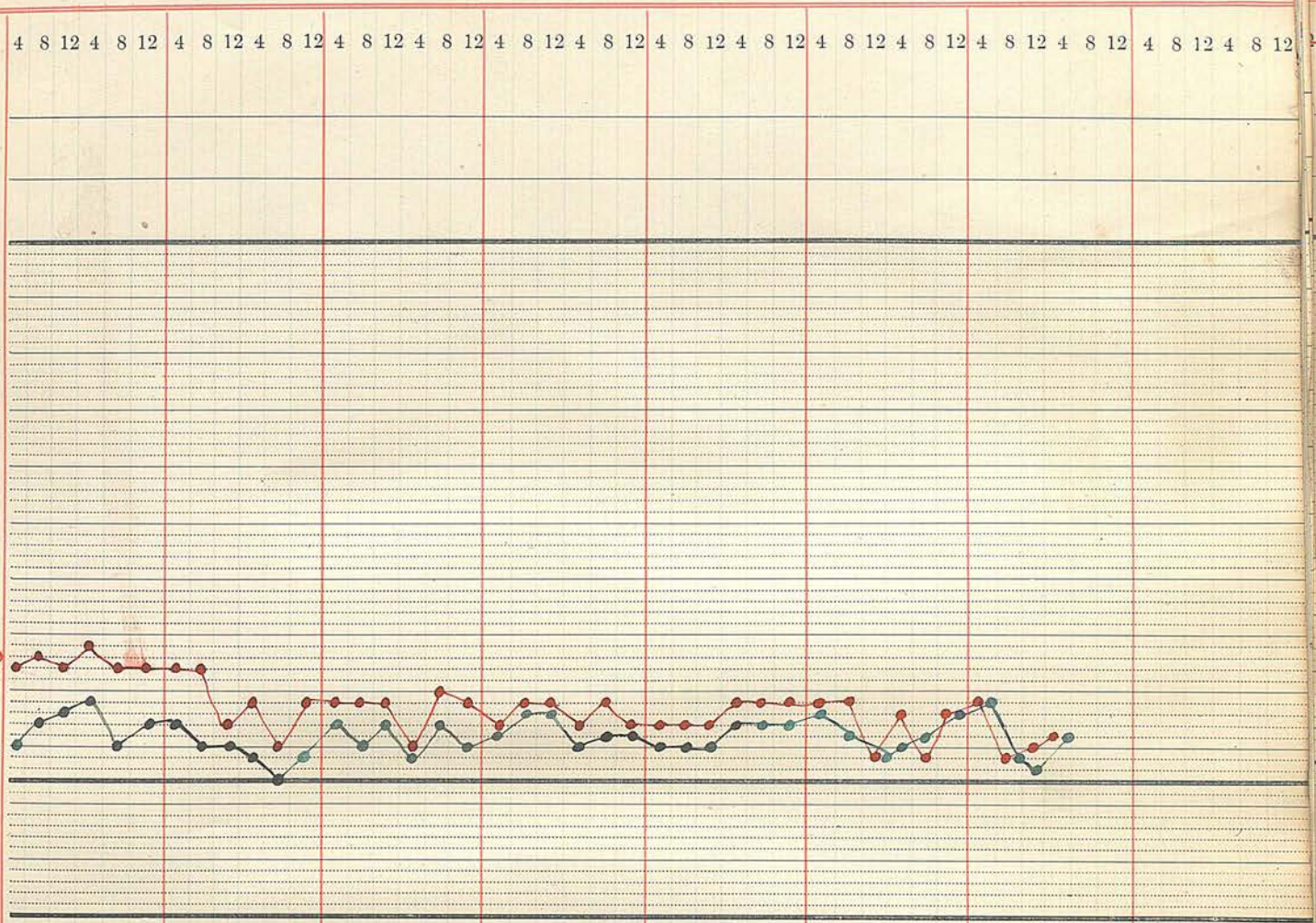
Total Comparison Observations = 25.

Average Variation = + 0·4 R. – Deg. F.

Chart showing amount of variation between rectal & Urine Temperature.

Patient's Name B. — M — (Case of Endocarditis). ~~Ward~~

~~Month~~ Chart No.



Red. = Rectal Temperature.

Green = Urine Temperature.

Total Comparison Observations. = 40

Average Variation = +0.5° Deg. F.

The groin temperature usually reached its full height in 15 minutes.
But in one case, (No.4), where the thermometer was left in the fold of the groin for 10 to 30 minutes until the reading of the instrument there coincided with that in the rectum; - 35 observations were taken in the case of this child and the average variation between the two temperatures was 0.1 Deg.F.+ rectal; (the chart of this case is appended.)

Groin and Rectal. Comparison Table.

Number	Case	Number of observations	Average variation
			Deg.F.
1.	Tuberculous Peritonitis.	18.	+1.2
2.	Convalescent Diphtheria.	15.	+1.1
3.	Convalescent Diphtheria.	27.	+0.5
4.	Diphtheria.	35.	+0.1
5.	? Tubercle.	21.	+0.1
6.	? Tubercle.	19.	+0.6
		135.	+0.6

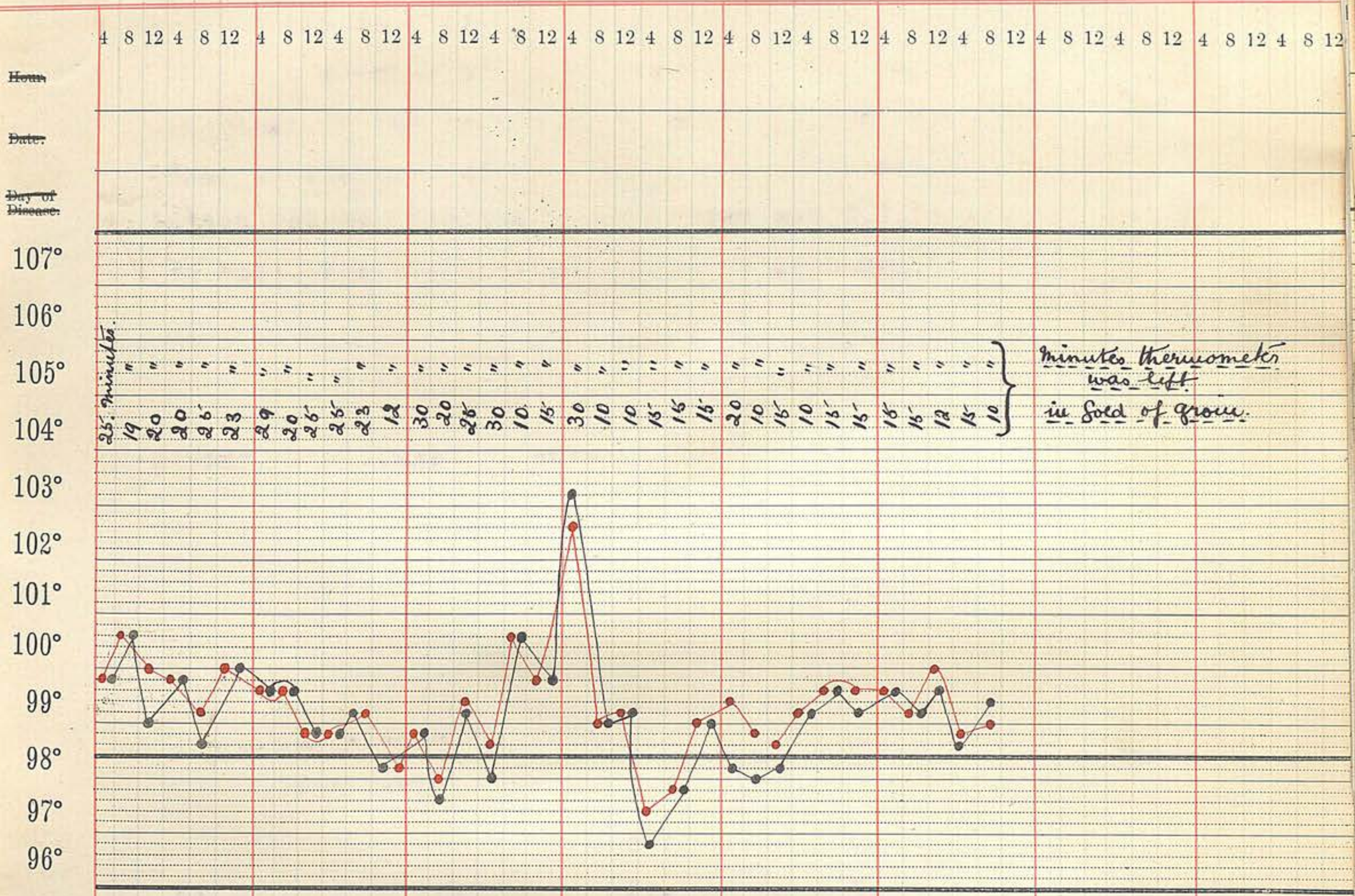
4. Axilla and Rectal.

In the 9 cases investigated 324 comparison observations have been taken showing an average variation of 0.9 Deg.F. + rectal, that is the rectal temperature exceeded that of the axilla by 9 points. The greatest variation was, 1.6 Deg.F. (in two cases Nos 1 and 2).

Chart showing the amount of variation between the inguinal & rectal temperature.

Patient's Name N. M- (Case of Diphtheria) ~~Ward~~

~~Month~~ Chart No.



~~Pulse.~~ ~~Respn.~~

Red = Rectal Temperature.
Black = Groin Temperature.

~~B. O.~~

~~Amt. of~~ Urine.

Total Comparison readings = 35

~~Sp. Gr.~~

Average variation = + 0·1. Deg. F.

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

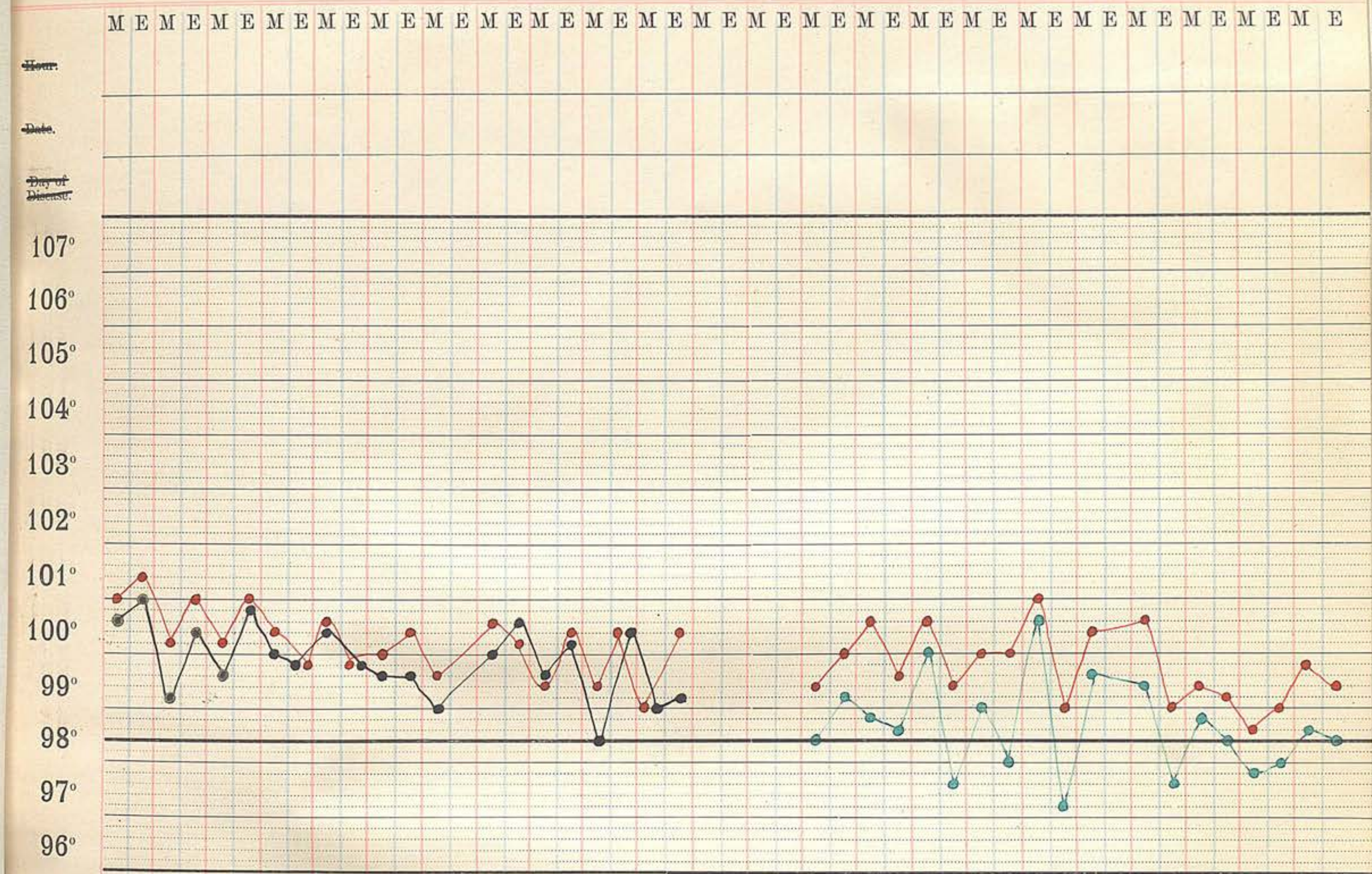
~~Vomit.~~

~~Weight.~~

Chart showing amount of variation between oral & rectal, – & axilla & rectal temperature.

Patient's Name B. C. (case of Chlorosis & Pleurisy) ~~Ward~~

~~Month~~ Chart No.



~~Pulse.~~ ~~Respn.~~ ~~B. O.~~

Red = Rectal Temperature.
Black = Mouth Temperature
Green = axilla Temperature.

~~Amt. of Urine.~~ ~~Sp. Gr.~~ ~~Reaction.~~ ~~Albumen.~~ ~~Sugar.~~ ~~Vomit.~~ ~~Weight.~~

Total Comparison readings.

Rectal & Mouth = 21. – Average variation = 0·3 + Rectal

Rectal & axilla = 19. – " " = 1·1 + Rectal.

The least variation was, 0.4 Deg.F. (No.7.).

Axilla and Rectal. Comparison Table.

Number	Case.	Number of observations.	Average variation.
			Deg.F.
1.	Endocarditis.	40.	+1.6
2.	Pulmonary Tuberculosis	19.	+1.6
3.	Pulmonary Tuberculosis	28.	+1.1
4.	Pulmonary Tuberculosis Tuberculous Peritonitis	31.	+0.8
5.	Constipation.	43.	+0.3
6.	Pleurisy.	19.	+1.1
7.	Enteric Fever.	47.	+0.4
8.	Gastrectasis.	44.	+0.6
9.	Addison's Disease.	13.	+1.0
		324.	+0.9

Exercise Observations.

A number of observations have been made for the purpose of estimating the effect of exercise on the temperature in different situations in the body.- Rectum, mouth, axilla, groin and urine.

in 1. Health.
2. Tuberculosis.
3. Other diseases.

In each case the temperature was taken just before and immediately after exercise, and then again after intervals of resting indoors. The observations have all been taken on consecutive days during the morning

Unless otherwise stated - "after Resting" - on the charts = 1/2 an hours rest.

between the hours of 11 a.m. and 1 p.m.

The form of exercise was of a moderate kind, (except in 2 cases, which are mentioned separately). viz, walking slowly 3 or 4 times round the Hospital garden; the time the exercise lasted, varied from- 10 to 20 minutes, according to the activity of the patient.

In the case of 3 children, the exercise took the form of running for five or ten minutes round the ward.

21 cases have been investigated, 12 of whom were suffering from some form of tuberculosis, of the remaining 9, 2 were convalescent from diphtheria, 6 were suffering from various diseases, and lastly the writer made observations on his own person.

Altogether 144 separate exercise reactions have been observed. A record of the temperature before and after exercise, and again after varying periods of rest, has been tested in the 21 cases investigated.

Tuberculous cases.- 12 - - - - Total Observations -83

It will be seen,(vide table) that in all the Tubercular cases a rise of temperature was constantly observed in all the situations, - the greatest average rise (1.0 Deg.F.) occurring in the rectum the urine followed next, with an average rise of only 2 points less than the rectal; the mouth coming 3rd with an average rise of ½ a degree-, exactly one ½ as much as the rectal. The axilla and groin showing an average rise of only 1, and 2 points respectively.

The greatest rise of Temperature always occurred

in cases of Pulmonary Tuberculosis, doubtful cases with very few physical signs showing just as great a rise, as advanced bad cases. The average Rectal rise in Phthisis was, 1.2 Deg.F. in one case the average rise was 1.8 Deg.F. The Mouth Temperature (in winter) - I have not had an opportunity of seeing whether the same applies in summer - cannot be solely relied upon in connection with exercise reactions, owing to the external influence of cold air; but the rectal, and urine temperature can be absolutely relied upon.

Exercise Observations.

Tubercular Cases.

average variation

NUMBER	CASE	NUMBER OF EXERCISE OBSERVATIONS	RECTAL	MOUTH	URINE	AXILLA	GROIN	REMARKS
			Deg F	Deg F	Deg F	Deg F	Deg F	
1.	Tuberculous Peritonitis	8	+0.7	0.0	-	-	-	Slow walking.
2.	Pulmonary Tuberculosis	9	+1.2	+1.1	+0.9	-	-	Hardly any cough.
3.	Tuberculous Peritonitis	6	+0.5	+0.3	-	-	+0.2	Running round ward.
4.	Pulmonary Tuberculosis	1	+0.8	-	-	-	-	
5.	Tuberculous Arthritis	7	+0.9	+0.6	-	-	-	Walks slowly lame.
6.	Pulmonary Tuberculosis	4	+1.2	+1.1	-	-	-	Little cough.
7.	Ditto	9	+1.8	+1.3	-	-	-	Bad case - much cough.
8.	Ditto	6	+1.7	+0.8	-	-	-	Running round ward.
9	Ditto	10	+0.8	0.0	--	-	-	Mouth breather.
10	Ditto	12	+0.8	-0.6	+0.7	+0.2	-	Ditto
11	Ditto	9	-	+0.7	+0.8	+0.4	-	Very little cough.
12.	? Tubercle	2	+0.6	0.0	~~0.8~~ -0.2		-	Slow walking.
	Totals	83	+1.0	+0.5	+0.8	+0.1	+0.2	

Chart showing the effect of Exercise on the rectal & oral temperature.

Patient's Name M.— M.— (Pat had cough, night sweats. ~~Ward~~ much wasting, haemoptysis, slight physical signs)

~~Month~~ Chart No.

~~Hour.~~
~~Date.~~
~~Day of Disease.~~

M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
Before Exercise.	After Exercise.	After Resting.	Before Exercise.	After Exercise.	After Resting.	Before Exercise.	After Exercise.	After Resting.	Before Exercise.	After Exercise.	After Resting.	Before Exercise.	After Exercise.	After Resting.	Before Exercise.	After Exercise.	After Resting.	Before Exercise.	After Exercise.	After Resting.	Before Exercise.	After Exercise.

107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°

"Running about ward for 10 minutes"

½ hour
1 hour

½ hour
2 hours.

½ hour
4 hours

1 hour
2½ hours

~~Pulse.~~
~~Respn.~~
~~B. O.~~
~~Amt. of Urine.~~
~~Sp. Gr.~~
~~Reaction.~~
~~Albumen.~~
~~Sugar.~~
~~Vomit.~~
~~Weight.~~

Red. = Rectal Temperature.
Black = Mouth Temperature.

Total Exercise Observations. = 6.

Average Rectal rise = 1·4. Drg. F. (greatest rise = 2·6).

Average Mouth rise = 0·8 Drg. F. (greatest rise = 1·2).

Chart showing the effect of Exercise on the oral & rectal temperature.

Patient's Name M. W. (Case of Tuberculous arthritis, & Lymphadenicditis.) ~~Ward~~

~~Month~~ Chart No.

~~Hour.~~	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
~~Date.~~	Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.	
~~Day of Disease.~~																																				
107°																																				
106°							〃		〃				〃						〃						〃													
105°																																				
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"Slow walking - Patient lame."

~~Pulse.~~

~~Respn.~~

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Red = Rectal Temperature.

Black = Mouth Temperature.

Total Exercise observations = 7.

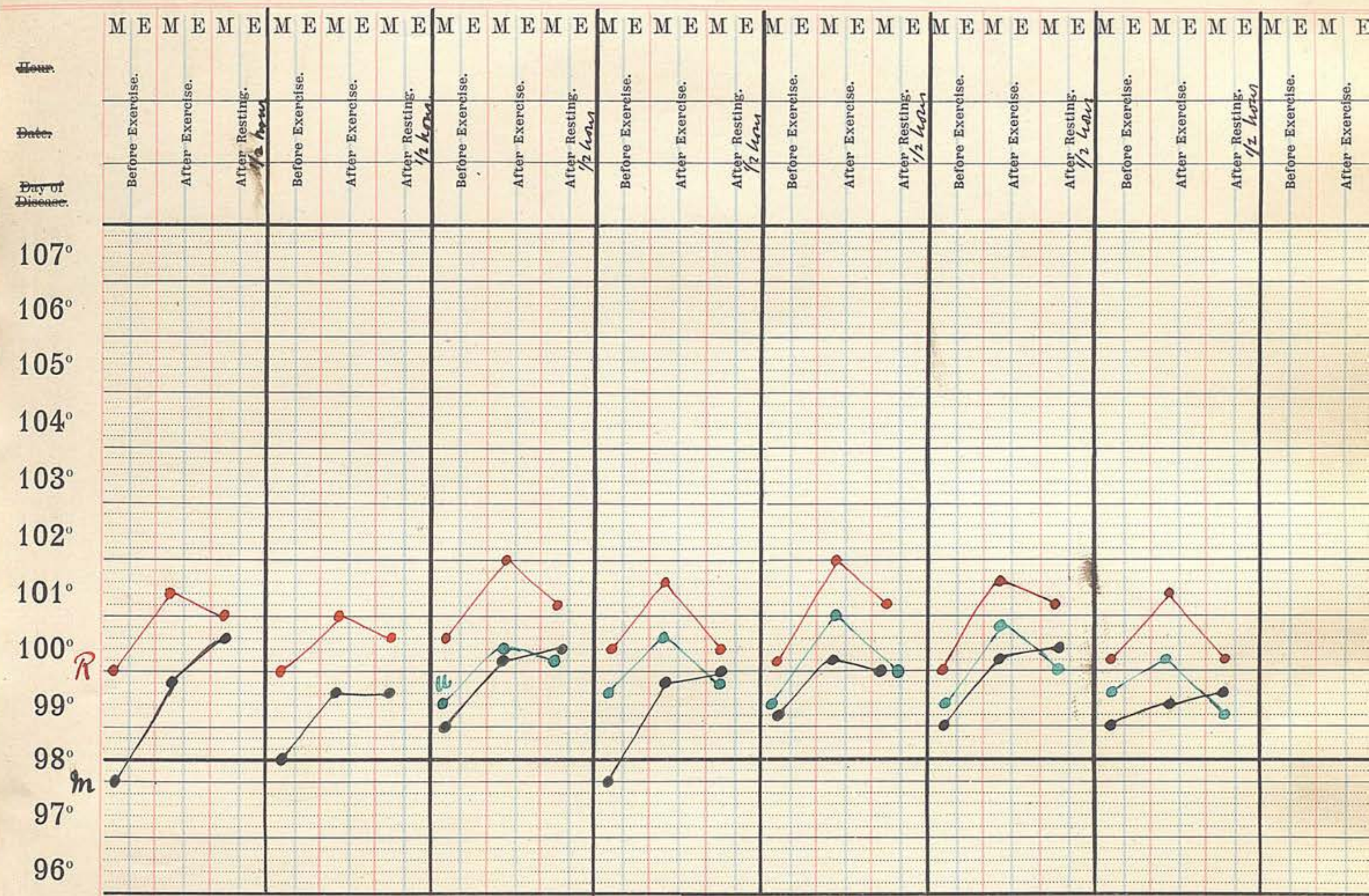
Average Rectal rise = 0.9. Deg. F. HH

Average Mouth rise = 0.6. Deg F.

Chart showing the effect of exercise on the rectal, oral & urine Temperature.

Patient's Name 7. – N. – (Case of mild Pulmonary Tuberculosis) ~~*Ward*~~

~~*Month*~~ *Chart No.*



~~Pulse.~~
~~Respn.~~
~~B.O.~~
~~Amt. of Urine.~~
~~Sp. Gr.~~
~~Reaction.~~
~~Albumen.~~
~~Sugar.~~
~~Vomit.~~
~~Weight.~~

Red. = Rectal Temperature
Black = Mouth Temperature.
Green = Urine Temperature.

Total Exercise Observations = 9.

Average Rectal rise = 1·2 Deg. F.

Average Mouth rise = 1·1. Deg. F.

Average Urine rise = 0·9. Deg. F.

Chart Showing the Effect of Exercise on the rectal, oral & urine temperature

Patient's Name T. - H - (Pulmonary Tuberculosis. Mild case) ~~Ward~~

~~Month~~ Chart No.

~~Hour.~~	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
~~Date.~~	Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.	
~~Day of Disease.~~																																				
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~~Pulse.~~

~~Respn.~~

~~B.O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Red = Rectal Temperature.

Green = Urine Temperature.

Black = Mouth Temperature.

Chart showing the Effect of Exercise on the oral, & urine Temperature

Patient's Name J. B. (Pulmonary Tuberculosis – mild case). ~~Ward~~

~~Month~~ Chart No.

~~Hour.~~ 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8

~~Date.~~ Before Exercise. After Exercise. After Resting.

~~Day of Disease.~~

107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°

~~Pulse.~~

~~Respn.~~ Green = Urine Temperature

~~B. O.~~ Black = Mouth Temperature.

~~Anal. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Total Exercise Observations = 9.

Average Urine rise = 0·8. Deg. F.

Average Mouth rise = 0·7. Deg. F.

Chart showing the effect of exercise (in very cold weather) on the oral temperature.

Patient's Name R. E. (Pulmonary Tuberculosis – bad case) ~~Ward~~

~~Month~~ Chart No.

~~Hour.~~ 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12

~~Date.~~ Before Exercise. After Exercise. After Resting.

~~Day of Disease.~~

107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°

very cold day. " " cold very cold very cold " " very cold.

~~Pulse.~~

~~Respn.~~

~~Tr. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight~~

Total Exercise Observations = 12.

Average mouth fall (after exercise) = 0.6. Drg. 4.

Average mouth rise (after resting) = 2.0. " ".

Chart showing the effect of Exercise on the rectal & oral Temperature

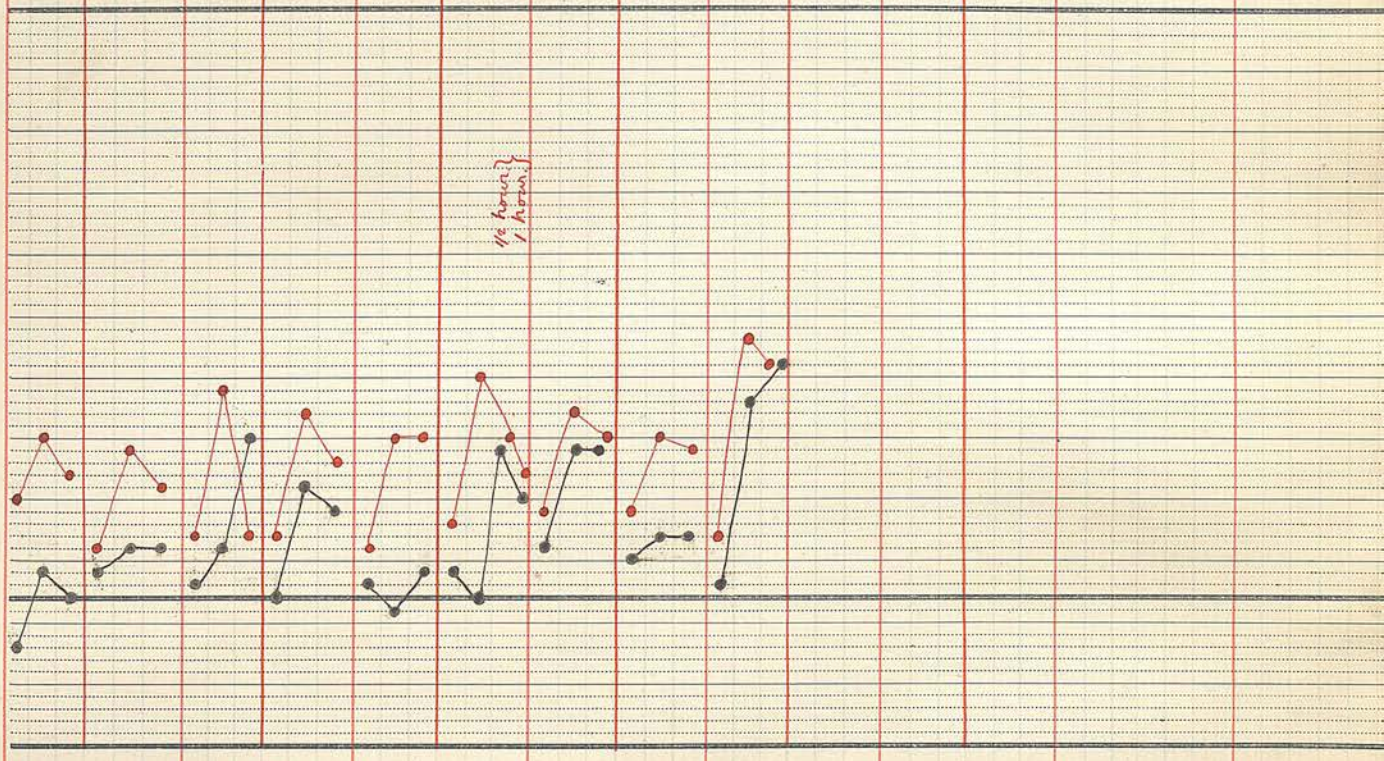
Patient's Name S. H. (Pulmonary Tuberculosis – Bad Care). ~~Ward~~

~~Month~~ Chart No.

~~Hour.~~ 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8 12 4 8

~~Date.~~ Before Exercise. After Exercise. After Resting.

~~Day of Disease.~~



~~Pulse.~~

~~Respn.~~

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Red. = Rectal Temperature.

Black = Mouth Temperature.

Total Exercise Observations = 9.

Average Rectal rise = 1·8. Deg. F.

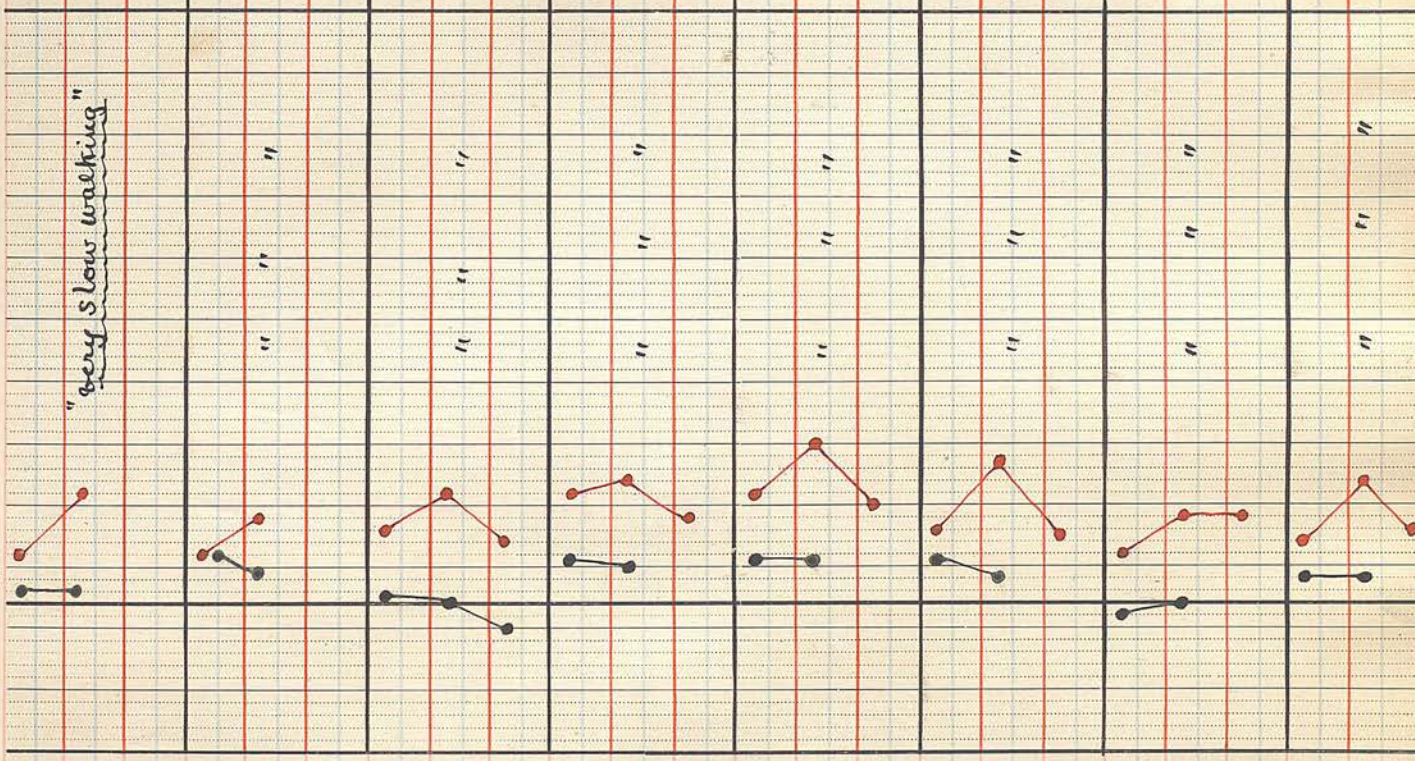
Average Mouth rise = 1·3. Deg. F.

Chart showing the effect of Exercise on the rectal & oral Temperature.

Patient's Name W. — H. — (case of Tubercular Peritonitis). ~~Ward~~

~~Month~~ Chart No.

~~Hour.~~	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
~~Date.~~	Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.
~~Day of Disease.~~																																



~~Pulse.~~

~~Respn.~~

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Red. = Rectal Temperature

Black = Mouth Temperature.

Total Exercise Observations = 8.

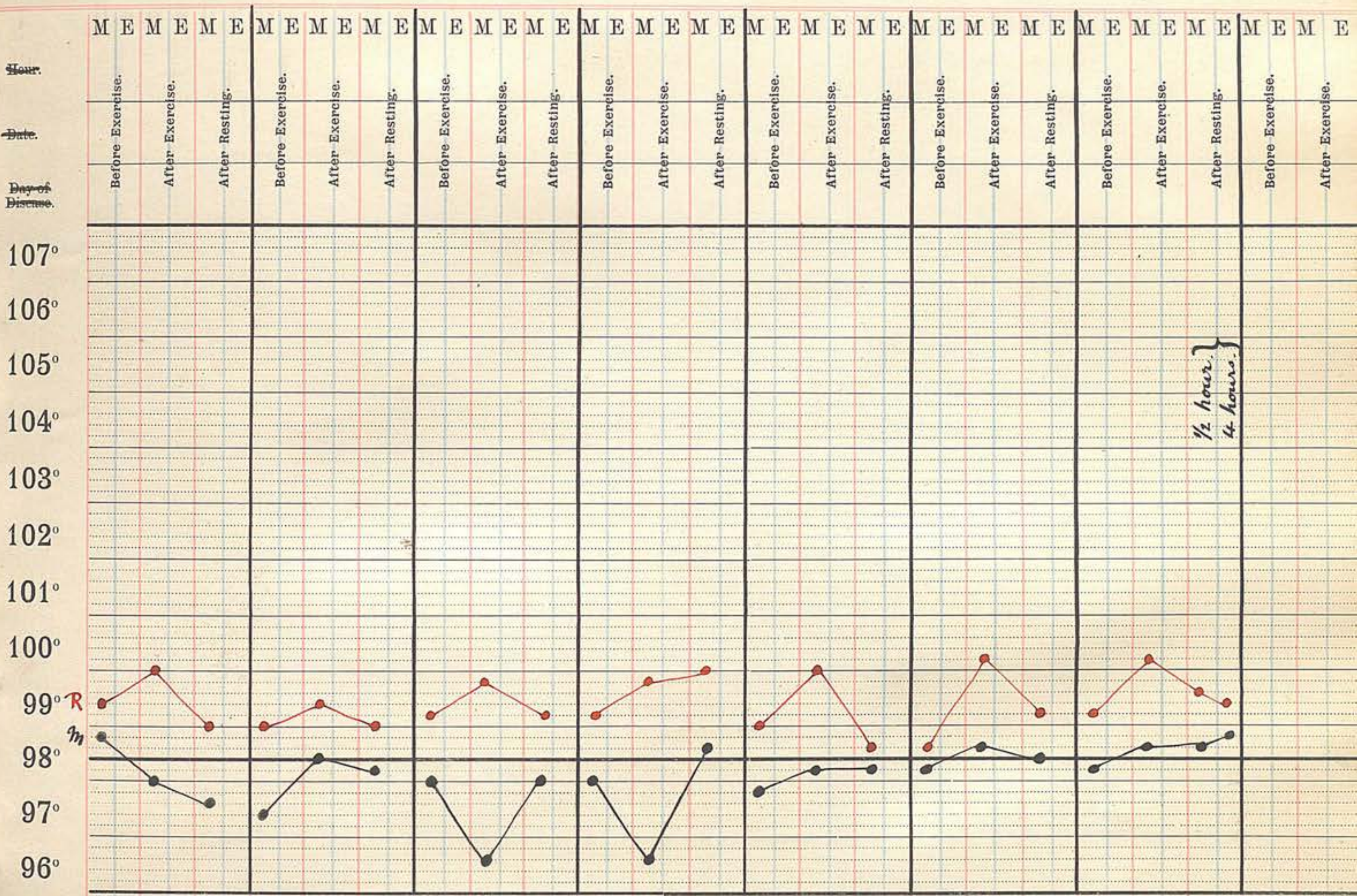
Average Rectal rise = 0.4 Deg. F.

Average Mouth variation = 0.0. " ".

Chart showing the effect of Exercise on the rectal & oral Temperature.

Patient's Name W. – C – (Pulmonary Tuberculosis. Mild case) ~~Ward~~

~~Month~~ Chart No.



~~Pulse.~~
~~Respn.~~
~~B. O.~~

Red = Rectal Temperature.
Black = Mouth Temperature.

~~Amt. of Urine.~~
~~Sp. Gr.~~
~~Reaction.~~
~~Albumen.~~
~~Sugar.~~
~~Vomit.~~
~~Weight.~~

Total Exercise Observations = 10.

Average Rectal rise = 0·8. Deg. F.

Average Mouth rise = 0·0. Deg. F.

Chart showing the effect of Exercise on the rectal & oral Temperature.

Patient's Name W – C – (Pulmonary Tuberculosis Mied Case.) ~~Ward~~

~~Month~~ Chart No.

~~Hour.~~	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
~~Date.~~	Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.	
~~Day of Disease.~~																																						
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106°																																						
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96°																																						

~~Pulse.~~

~~Resp.~~

Red = Rectal Temperature.

Black. = Mouth Temperature

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Situation.	Number of cases investigated	Number of temperature obser - vations.	variation
			Deg.F.
Rectum.	11.	74.	+1.0
Mouth.	11.	82.	+0.5
Urine.	3.	30.	+0.8
Axilla.	3.	23.	+0.1
Groin.	1.	6.	+0.2
Total.	29.	215	

In health and other diseases - 9.-

Total observations - 61

after the same amount of exercise there was, in the total cases investigated, an average rise of temperature in the rectum of 3 points; in the mouth of only 1 point; the temperature of the urine and in the axilla being unaffected; while that of the groin fell 1 point.

In all these situations there was frequently a fall of temperature after exercise - of from 1 to 6 points.

The greatest rectal rise of temperature took place in children, and in adults taking exercise for the first time after convalescence from a long illness with confinement to bed.

Table of Exercise Observations.

a. Moderate Exercise
b. Severe Exercise

In Health and non tubercular diseases.

(a) Moderate Exercise.

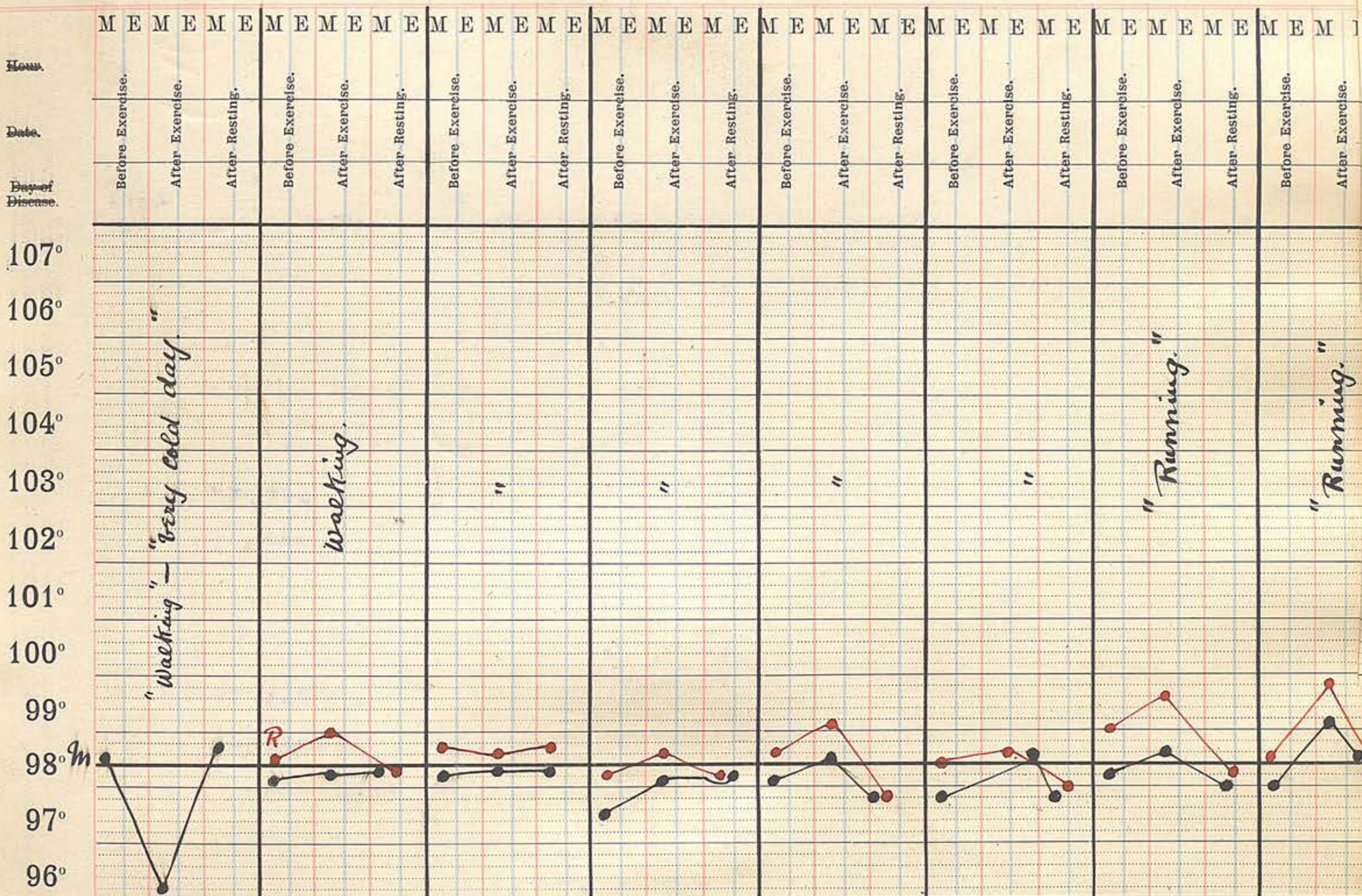
Number	Case	Number of observations	Average variation Rectal	Mouth	Urine	Axilla	Groin	Remarks.
			Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	
1.	Diabetes	5.	+0.3	-0.4	—	—	—	
2.	Endocarditis	8.	+0.4	+0.7	+0.2	+0.7	—	
3.	Gastrectasis	6.	+0.2	0.0	—	—	—	
4.	Chronic Brights	7.	+0.4	+0.1	+0.1	0.0	—	Boy aged 14.
5.	Osteo Arthritis.	6.	+0.3	-0.6	-0.2	-0.6	—	
6.	Convalescent Diphtheria & Measles.	5.	+0.2	0.0	—	—	-0.4	Child aged 4.
7.	Convalescent Diphtheria	8.	+0.5	+0.4	—	—	0.0	Child aged 10.
8.	Self	7.	+0.3	+0.1	+0.2	—	—	
9.	Crétinism	3.	+0.4	+0.4	—	—	—	Child aged 12.
	Total	55.	+0.3	0.1	0.0	0.0	-0.1	

Situation.	Number of cases investigated	Number of observations	Average variation
			Deg.F.
Rectum.	9.	55.	+0.3
Mouth.	9.	55.	+0.1
Urine.	4.	28.	0.0
Axilla.	3.	21.	0.0
Groin.	2.	13.	-0.1
Total	27.	172	

Chart showing the effect of moderate, & severe exercise on the rectal & oral temperature

Patient's Name A– S.– (case of Gastrectasis) ~~Ward~~

~~Month~~ Chart No.



{ Red. = Rectal Temperature.
{ Black = Mouth Temperature.

Total Exercise Observations = 8. { Walking = 6. Running = 2.

	"Walking."	"Running."
Average Rectal rise =	0·2. Deg F.	0·9. Deg F.
Average Mouth rise =	0·0. "	0·7. "

Chart showing the Effect of Exercise on the rectal & oral Temperature.

Patient's Name V. – V. – (Convalescent case of Diphtheria.)

~~Ward~~

~~Month~~

Chart No.

	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
~~Hour.~~	Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.	
~~Date.~~																																						
~~Day of Disease.~~																																						

107°
106°
105°
104°
103°
102°
101°
100°
99° R
Rm
98°
97°
96°

"Running about ward"

~~Pulse.~~
~~Respn.~~
~~B. O.~~
~~Amt. of Urine.~~
~~Sp. Gr.~~
~~Reaction.~~
~~Albumen.~~
~~Sugar.~~
~~Vomit.~~
~~Weight.~~

Red = Rectal Temperature.

Black = Mouth Temperature.

Total Exercise Observations = 5.

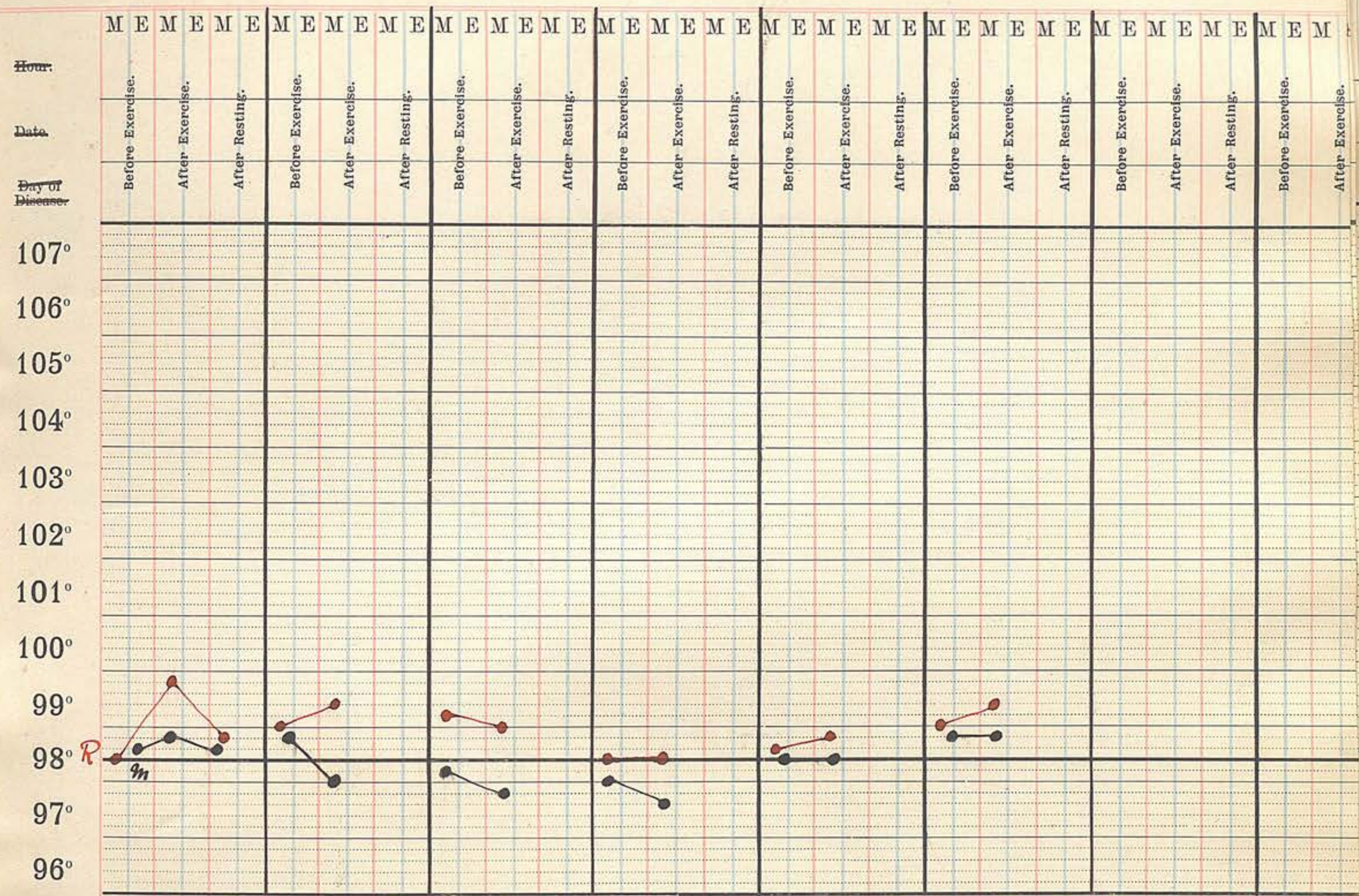
Average Rectal rise = 0·2 Deg. F.

Average Mouth rise = 0·0 Deg. F.

Chart showing the effect of Exercise on the rectal & oral Temperature.

1 Patient's Name E— G.— (Case of osteo arthritis) ~~Ward~~

~~Month~~ Chart No.



~~Pulse.~~

~~Respn.~~

~~B.O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

{ Red = Rectal Temperature.
{ Black = Mouth Temperature.

Total Exercise Observations = 6.

Average Rectal rise = 0·3. Deg. 4.

Average Mouth fall = 0·2. Deg. 7.

"Self." Chart showing the effect of moderate & severe Exercise on the rectal, oral & urine Temperature.

Patient's Name ..... ~~Ward~~ .....

Month December 1900 & Jan^y 1902. Chart No. .....

~~Hour.~~ 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 12 | 4 8 1

~~Date.~~ Before Exercise. | After Exercise. | After Resting.

~~Day of Disease.~~

107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°

"walking" " " " " " " "

"Bicycle ride 7 miles & playing Golf for 2 hours"

"Running 2 1/2 miles"

"Bicycle ride 12 miles"

"Running 2 miles"

~~Pulse.~~

~~Resp.~~

~~B. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Red = Rectal Temperature.
Green = Urine Temperature.
Black = Mouth Temperature.

} Total = 11. { Moderate Exercise = 7. / Severe, or prolonged Exercise = 4.

	Moderate Exercise.	Severe Exercise.
Average Rectal variation =	0·3+	1·4+.
Average Urine variation =	0·2+	1·3+.
Average Mouth variation =	0·1+.	1·4+.

Chart showing the effect of Exercise on the oral & rectal Temperature.

Patient's Name W. – S – (Case of Diabetes Mellitus) ~~Ward~~

~~Month~~ Chart No.

Hour.	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
Date.	Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.		After Resting.		Before Exercise.		After Exercise.	
Day of Disease.																																				
107°																																				
106°																																				
105°																																				
104°																																				
103°																																				
102°																																				
101°																																				
100°																																				
99°																																				
98° R																																				
M																																				
97°																																				
96°																																				

~~Pulse.~~

~~Resp.~~

~~Br. O.~~

~~Amt. of Urine.~~

~~Sp. Gr.~~

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

Red = Rectal Temperature.

Black = Mouth Temperature

Total Exercise Observations = 5.

Average Rectal rise = 0·3 Deg. F.

Average Mouth fall = 0·4 Deg. F.

The effect of moderate exercise- therefore- in tubercle produces a greater rise of temperature than in health, or other diseases.

Table showing the average rise of temperature in Tubercular and non Tubercular cases after the same amount of exercise.

Situation.	Tubercular cases.	Non Tubercular cases.	Average difference between the two.
	Deg.F	Deg.F	Deg.F
Rectum.	+1.0	+0.3	0.7
Mouth.	+0.5	+0.1	0.4
Urine.	+0.8	0.0	0.8
Axilla.	+0.1	0.0	0.1
Groin.	+0.2	-0.1	0.3

The effect of long continued and severe exercise on Temperature.

6 observations have been taken, - 2 in a man suffering from Gastrectasis, and 4 in myself.-

In the former case (No 2) the exercise consisted in running about 2 miles, when the patient was fatigued and sweating. The average rise of rectal temperature was 0.9 Deg.F.

The average rise of mouth temperature was 0.7 Deg. F.

In my own case (no 1) - the exercise consisted on two occasions in running fast for 20 minutes, causing dyspnoea, profuse sweating, and rapid pulse; on the other two occasions the exercise was long continued, lasting for 3 to 4 hours, and consisted of bicycle riding and playing golf. There was no sweating, notice-

able fatigue or acceleration of pulse rate or respirations, but the rise of temperature was slightly greater than in the former two observations.

The average rise in the 4 observations of rectal and mouth temperature, was 1.4 Deg.F. of Urine - 1.3 Deg.F.

(b.) Severe Exercise. Table.

Number	Case	Number of observations.	Average variation Rectal.	Mouth.	Urine.
			Deg.F.	Deg.F.	Deg.F
1.	Self.	4.	+ 1.4	+ 1.4	+1.3
2.	Gastrectasis.	2.	+ 0.9	+0.7	
	Total.	6.	+ 1.1	+1.0	+1.3

The length of time which elapses before the temperature resumes its "status quo ante".

1. In Tuberculosis.- In the majority of cases the temperature begins to fall immediately exercise has ceased, and continues falling for half an hour until its original level in reached. In a few cases the temperature goes on rising 2 or 3 points or remains stationary, ultimately falling, it may be some hours later in the evening.

Occasionally a more gradual fall is seen, 1 to 3 hours elapsing before the temperature resumes its "status quo ante".

2. In normal or otherwise diseased cases. -
The temperature ~~always~~ almost invariably begins to fall immediately muscular action has ceased, and in from 10 - 30 minutes, the "status quo ante", is almost always reached.

The effect of high frequency currents of electricity on the temperature of the body.

In 6 cases of Phthisis I have had an opportunity of observing the effect of these currents on the oral temperature and in each case there was a rise of from 1 to 3 degrees after an application lasting 10 minutes; - in two cases of extensive lupus (without pulmonary tuberculosis), the temperature rose 1 to 2 degrees.- after resting 15 minutes the raised temperature in all the cases persisted.

In my own case, and of that of another normal individual, there was a rise of temperature of from 4 to 6 points, after an application lasting 15 minutes.

I have not yet had an opportunity of observing if a corresponding amount of pryxia is produced in other diseases than tuberculosis from the application of this form of electricity.

Galvanic and Faradic Electricity.

The effect of 15 to 20 minutes application of the Faradic or Galvanic current of electricity, in several cases of Tubercle, was not to cause any variation of the body heat.

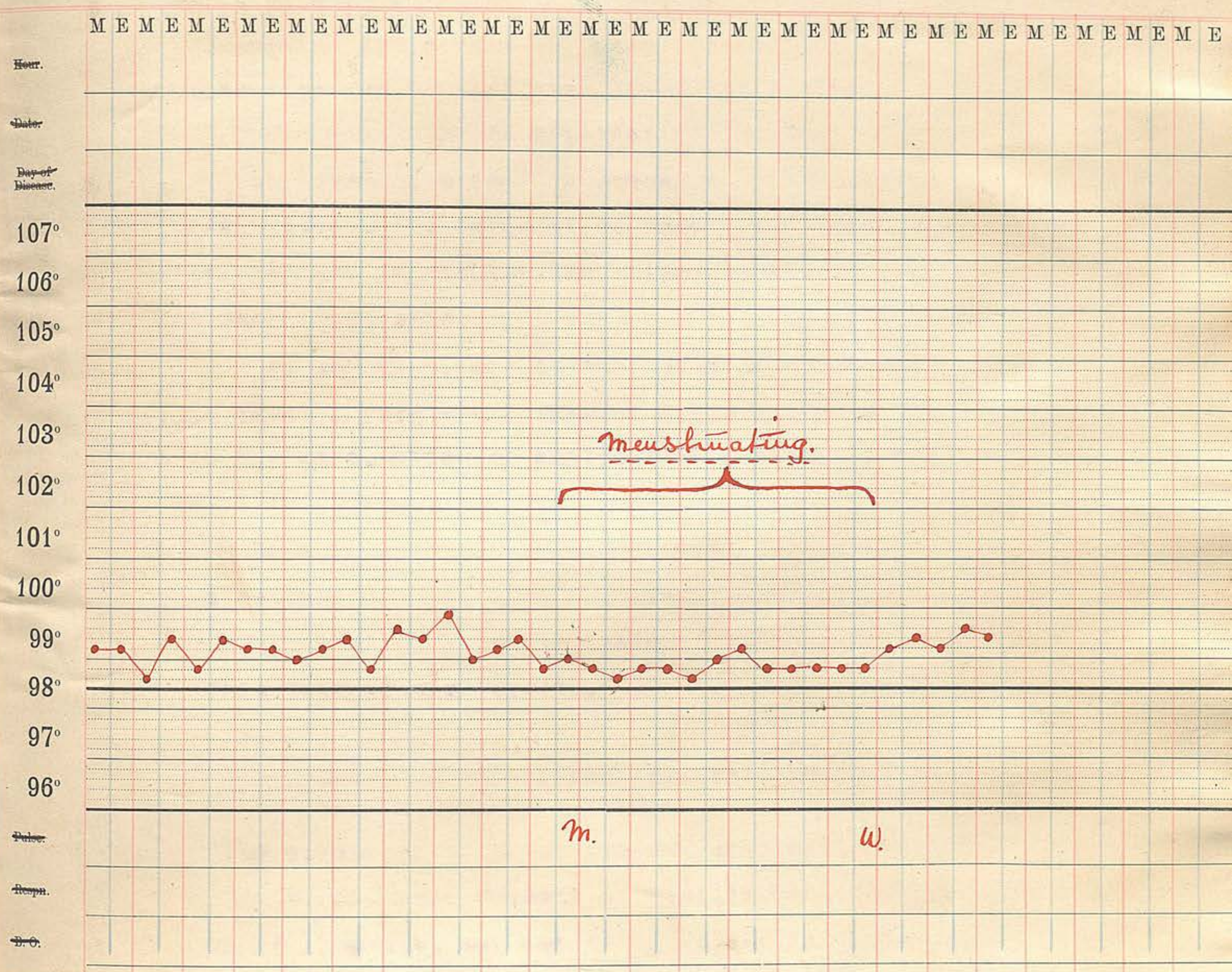
The effect of menstruation on the temperature of the body.

In Tuberculosis a pre-menstrual rise of temperature in the rectum, and mouth has been frequently observed. The temperature begins to rise from the third to the tenth day before the commencement of the

Chart showing the effect of Menstruation on the temperature

Patient's Name B. H. (Pulmonary Tuberculosis – Mild Case). ~~Ward~~

~~Month~~ Chart No.



~~Amt. of Urine.~~

M. = Commencement of menstruation.

~~Sp. Gr.~~

W. = Cessation of menstruation.

~~Reaction.~~

~~Albumen.~~

~~Sugar.~~

~~Vomit.~~

~~Weight.~~

onset of the menstrual flow, and is usually maintained for several days, falling on the first day, and remaining down until the cessation of the discharge.

The average rise is 0.5 Deg.F. (vide temperature chart of one case)

I have not observed a corresponding pre-menstrual rise of temperature, in other diseases, or in health.

The effect of exercise on the temperature of cows.

The Rectal temperature of twelve cows has been taken, immediately before, and after exercise.

In one case there was a fall of temperature of 6 points; in one other there was no change, while in the remaining 10, the temperature rose from 0.2 to 1.4 Deg.F. the average rise being 0.8 Deg.F.

Each of the cows was afterwards inoculated with tuberculin, and the temperature of each was recorded at the end of 6, 9, 12, and 15 hours respectively but no definite reaction followed in any one case.
Tubercle was suspected in 7 out of the 12, on account of cough, and some wasting.

Temperature.

Number.	Before exercise	After exercise	Before Inoculation	6 hours	9 hours	12 hours	15 hours	Remarks
	Deg.F.	Deg.F.	Deg.F	Deg.F	Deg.F	Deg.F	Deg.F	
1	101.4	101.8	102.	102.2	102.4	103.	102.8	
2	102.2	102.4	102.	101.2	101.	100.4	101.	
3	102.8	103.4	102.	102	101.8	101	101.	cough
4	101.4	102.4	101.2	101.6	101	102	101.4	cough.
5	102	103.2	100.6	101.2	100	100.2	100.	cough, much wasting
6.	102.8	103	102	102.2	101.6	101.6	102	
7	102	103	102.2	101.6	101	100.8	100.6	cough.
8.	103.4	102.2	101.8	102	101.2	101	101.2	cough.
9.	103.8	103.8	102.8	102.2	102.2	101.6	101.4	cough.
10.	102	103	101.6	102	101.4	101.4	101.2	cough.
11.	101.	102.4	102.6	103.4	102.2	101.4	101.2	
12.	101.4	102.2	100.6	101	101	101.4	101.6	

The form of exercise consisted in smart walking and occasional running, for a period of about 10 minutes.

In 7 cows after resting 20 minutes, the temperature was again taken, in one case the temperature rose 1 degree, in the remaining 6 there was a fall of from 0.2, to 1 degree.F. - the average fall of Temperature, after resting, was 0.6 Deg.F.

Had some of the cows shown a definite reaction after inoculation with tuberculin, it was my intention to have considerably extended the investigation, with the object of ascertaining whether exercise in tubercle produces a greater rise of temperature, than

in health - thus corresponding to human tuberculosis.

In the meantime I am trying to discover a tuberculous cow when I hope to repeat the observations.

I am at present investigating the effect of exercise on the rectal temperature of dogs and horses, but I am unable, at present, to give any details, beyond stating that in both animals, exercise causes a rise of temperature.

Conclusions.

As a result of these observations, I feel justified in drawing the following conclusions -

1. The value and relative reliability of -

(a) Oral Temperature.

The correct temperature is not registered under 10 to 15 minutes, the length of time is dependent upon certain external and internal conditions, and upon differences which are not yet understood in different individuals.

The average difference between a 5 and a 15 minute mouth reading is 0.76 of a degree.

The average oral temperature is 0.3 of a degree lower than the rectal temperature; and 0.2 of a degree higher than the urine temperature. After out-of-door exercise in cold weather the mouth temperature cannot be solely relied upon in some cases as a correct record of the internal temperature, until a sufficient period has elapsed to allow of the mouth chamber becoming warmed.

(b) Rectal Temperature.

From 3 to 5 minutes is required for a correct reading.

The rectal temperature is 0.3, of a degree higher than the oral temperature, and 0.5, of a degree higher than the urine temperature. It should always be used as a control in doubtful cases and especially in connection with exercise observations.

(c) Urine Temperature.

From two, to 5 ounces of urine are sufficient to register the correct temperature.

The temperatures of the urine and of the rectum, are the only ones that can be absolutely relied upon after exercise out-of-doors.

(d) Inguinal Temperature.

From 10 to 30 minutes is required for a correct reading, - a longer time than in any other situation.

The average variation between a 5, and a 15 minute inguinal temperature is, 0.6 of a degree.

The inguinal temperature is 0.6 Deg.F. lower than the mouth temperature, and 0.3 Deg.F. higher than the axillary.

(e) Axillary Temperature.

A correct reading is not obtained under 10 to 15 minutes. The average variation between a 5 and a 15 minute reading is, 0.4, of a degree.

It is 0.9 of a degree, lower than the rectal

temperature, and is the least reliable situation, in which to obtain a correct estimate of the temperature of the body.

II The effect of exercise on the temperature in, health, tuberculosis, and other diseases, and other animals.

Moderate exercise in all forms of tuberculosis, (whether incipient or advanced) always causes a rise of temperature to a greater extent, than in health, and other diseases.

after moderate exercise -
An average rise of temperature in the rectum of 1 degree, or of the urine, of 0.8, of a degree, is pathognomonic of tubercle.

In Pulmonary Tuberculosis the average rise of rectal temperature is 1.2 Deg.F.

I have not had an opportunity of investigating the effect of exercise on the temperature of patients suffering from marked febrile diseases, (other than Tubercle) but, in comparatively a-febrile case, and in health, the average rise of temperature in the rectum after moderate exercise is 0.3 of a degree, - the urine temperature is unaffected.

Severe, or long continued exercise in health, or other diseases, (excluding tubercle), produces an average rise of temperature, in the rectum, of 1.15 Deg.F. - of the urine of 1.3 Deg.F.

After resting half an hour, the temperature produced by exercise (in health, tubercle or other diseases), as a general rule, resumes its "status quo ante".

In cows,- there is, almost invariably, a rise of rectal temperature after moderate exercise, of from 0.2 to 1.4 Deg.F. - after resting 20 minutes there is a fall of temperature of, from 0.2, to 1.0 Deg.F.

In dogs, and horses,- exercise also causes a rise in temperature.

III. The effect of electricity on temperature.

The application of "high frequency currents of electricity", in pulmonary tuberculosis, and lupus, causes a rise of temperature of from 1.0 to 3.0 degrees. In health the greatest rise I have observed was 0.6 of a degree.

The galvanic and faradic currents of electricity do not, in tubercle, cause any variation in the body heat.

The effect of Menstruation on Temperature.

An average pre-menstrual rise of temperature of 0.5 Deg.F. is frequently observed in cases of tuberculosis; the temperature falling, and remaining down during the continuance of the menstrual flow.